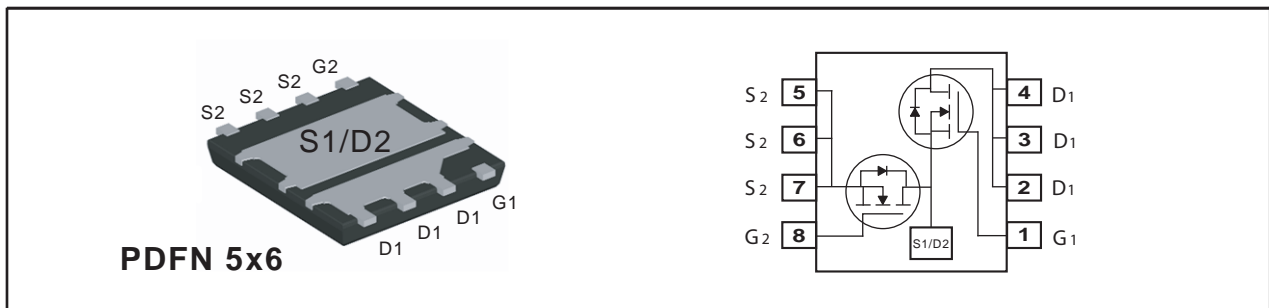


**Dual N-Channel Enhancement Mode Field Effect Transistor****PRODUCT SUMMARY (DIE 1)**

V _{DS}	I _D	R _{DS(ON)} (mΩ) Max
40V	40A	15 @ V _{GS} =10V
		20 @ V _{GS} =4.5V

PRODUCT SUMMARY (DIE 2)

V _{DS}	I _D	R _{DS(ON)} (mΩ) Max
40V	54A	10 @ V _{GS} =10V
		15 @ V _{GS} =4.5V

**ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)**

Symbol	Parameter		Die 1	Die 2	Units
V _{DS}	Drain-Source Voltage		40		V
V _{GS}	Gate-Source Voltage		±20		V
I _D	Drain Current-Continuous ^b	T _C =25°C	40	54	A
		T _C =70°C	32	43.2	A
I _{DM}	-Pulsed ^b		89	94	A
E _{AS}	Sigle Pulse Avalanche Energy ^c		81	121	mJ
P _D	Maximum Power Dissipation	T _C =25°C	42	62.5	W
		T _C =70°C	27	40	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range		-55 to 150		°C

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case	3	2	°C/W
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SP4810

Ver 1.0

DIE 1 - ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V , V _{GS} =0V			1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	1.5	3	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V , I _D =10A		12	15	m ohm
		V _{GS} =4.5V , I _D =8.5A		15	20	m ohm
g _{FS}	Forward Transconductance	V _{DS} =5V , I _D =10A		31		S
DYNAMIC CHARACTERISTICS ^a						
C _{iss}	Input Capacitance	V _{DS} =20V,V _{GS} =0V f=1.0MHz		662		pF
C _{oss}	Output Capacitance			121		pF
C _{RSS}	Reverse Transfer Capacitance			95		pF
SWITCHING CHARACTERISTICS ^a						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =20V I _D =1A V _{GS} =10V R _{GEN} = 6 ohm		13		ns
t _r	Rise Time			16		ns
t _{D(OFF)}	Turn-Off Delay Time			38		ns
t _f	Fall Time			9		ns
Q _g	Total Gate Charge	V _{DS} =20V,I _D =10A,V _{GS} =10V		12		nC
		V _{DS} =20V,I _D =10A,V _{GS} =4.5V		6.2		nC
Q _{gs}	Gate-Source Charge	V _{DS} =20V,I _D =10A, V _{GS} =10V		1.3		nC
Q _{gd}	Gate-Drain Charge			3.7		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V,I _S =3A		0.78	1.2	V

Notes

- Guaranteed by design, not subject to production testing.
- Drain current limited by maximum junction temperature.
- Starting T_J=25°C, L=0.5mH, V_{DD} = 20V. (See Figure13)
- Mounted on FR4 Board of 1 inch² , 2oz.

Dec,19,2016

DIE 2 - ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V , V _{GS} =0V			1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	1.6	3	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V , I _D =13.5A		8	10	m ohm
		V _{GS} =4.5V , I _D =11A		11	15	m ohm
g _{FS}	Forward Transconductance	V _{DS} =5V , I _D =13.5A		22		S
DYNAMIC CHARACTERISTICS ^a						
C _{iss}	Input Capacitance	V _{DS} =20V,V _{GS} =0V f=1.0MHz		1414		pF
C _{oss}	Output Capacitance			170		pF
C _{RSS}	Reverse Transfer Capacitance			146		pF
SWITCHING CHARACTERISTICS ^a						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =20V I _D =1A V _{GS} =10V R _{GEN} = 6 ohm		23		ns
t _r	Rise Time			27		ns
t _{D(OFF)}	Turn-Off Delay Time			68		ns
t _f	Fall Time			38		ns
Q _g	Total Gate Charge	V _{DS} =20V,I _D =13.5A,V _{GS} =10V		23		nC
		V _{DS} =20V,I _D =13.5A,V _{GS} =4.5V		12		nC
Q _{gs}	Gate-Source Charge	V _{DS} =20V,I _D =13.5A, V _{GS} =10V		2		nC
Q _{gd}	Gate-Drain Charge			6.2		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V,I _S =3A		0.78	1.2	V

Notes

- Guaranteed by design, not subject to production testing.
- Drain current limited by maximum junction temperature.
- Starting T_J=25°C, L=0.5mH, V_{DD} = 20V. (See Figure13)
- Mounted on FR4 Board of 1 inch² , 2oz.

Die 1

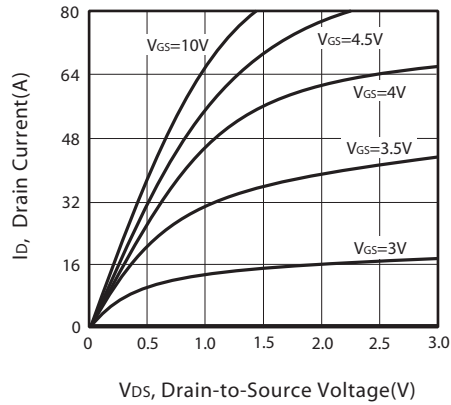


Figure 1. Output Characteristics

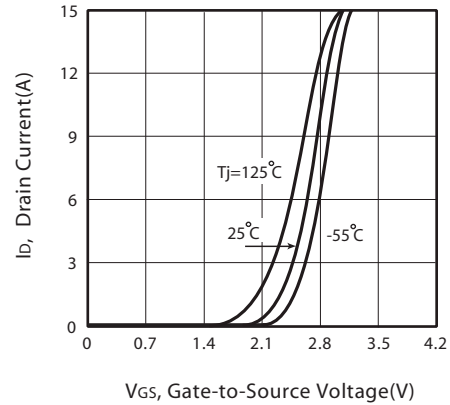


Figure 2. Transfer Characteristics

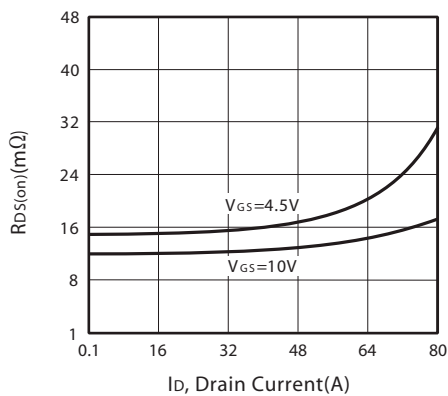


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

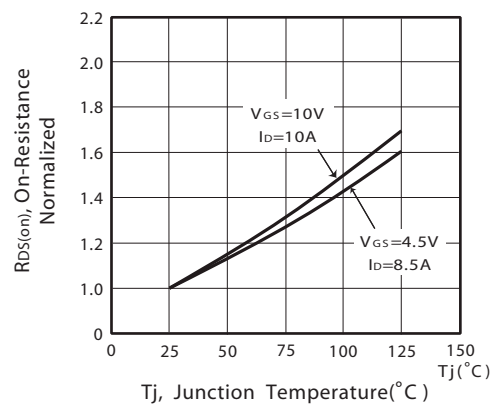


Figure 4. On-Resistance Variation with Drain Current and Temperature

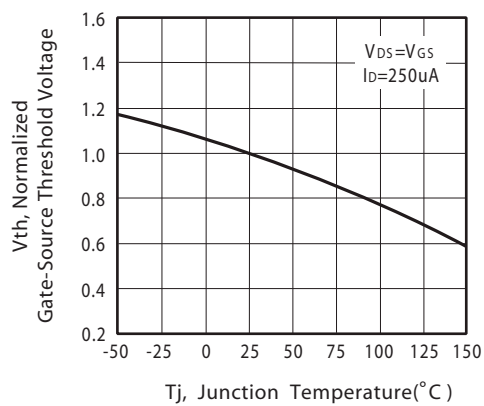


Figure 5. Gate Threshold Variation with Temperature

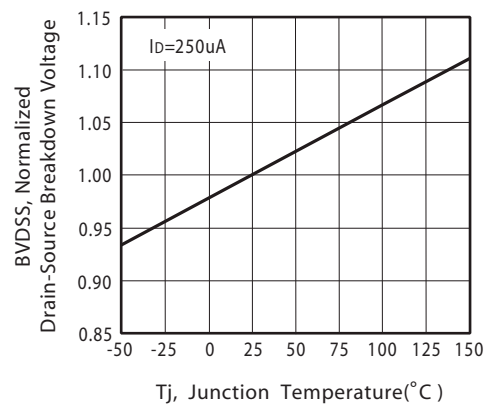


Figure 6. Breakdown Voltage Variation with Temperature

Die 1

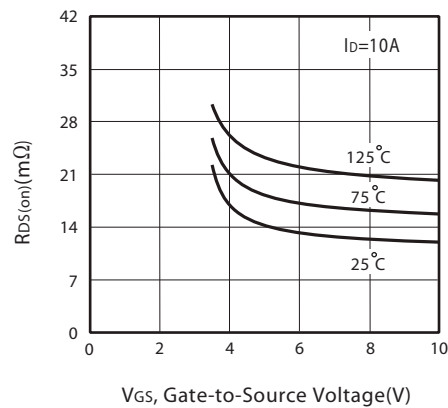


Figure 7. On-Resistance vs. Gate-Source Voltage

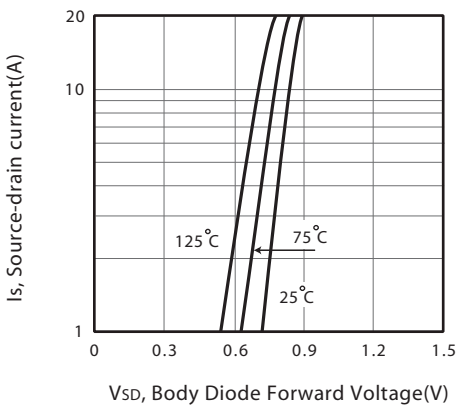


Figure 8. Body Diode Forward Voltage Variation with Source Current

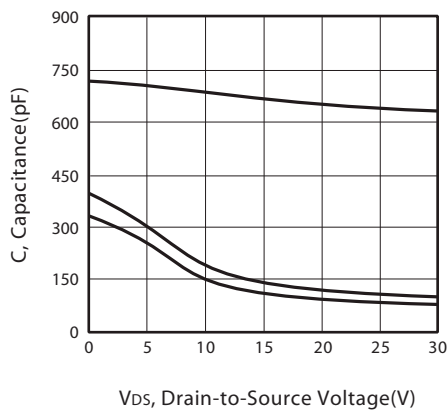


Figure 9. Capacitance

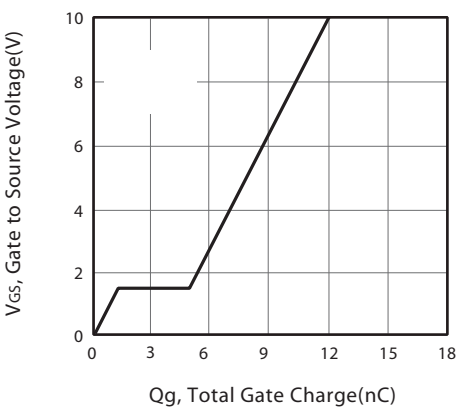


Figure 10. Gate Charge

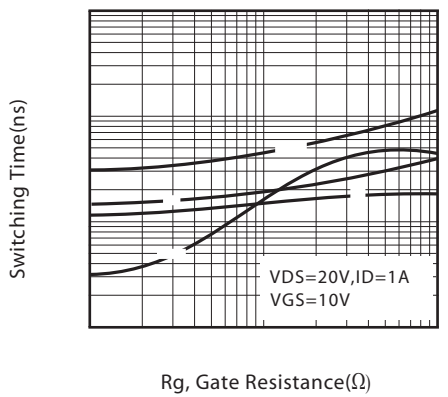


Figure 11. switching characteristics

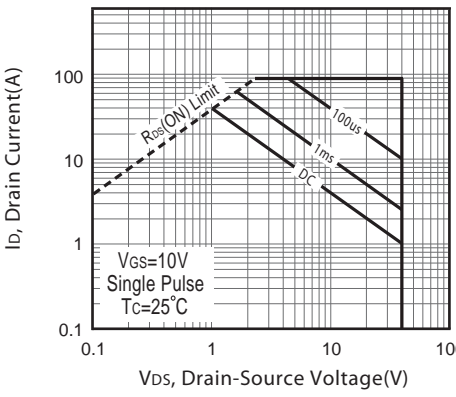
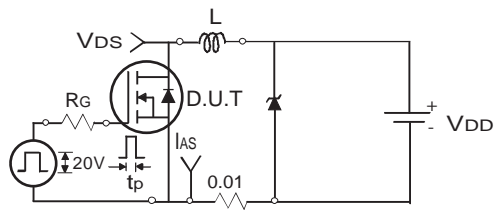


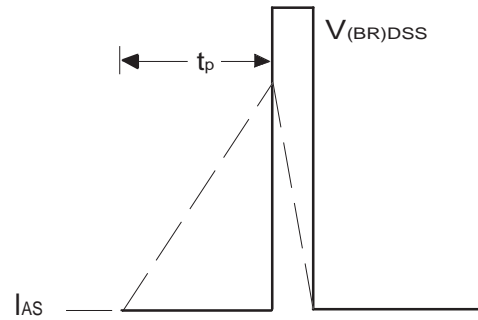
Figure 12. Maximum Safe Operating Area

Die 1



Uncamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

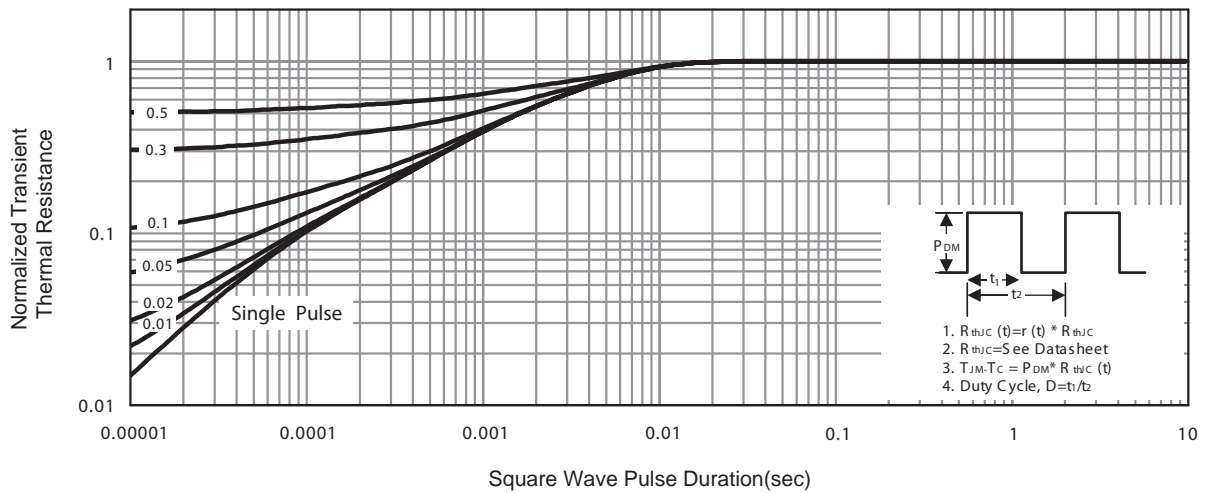


Figure 14. Normalized Thermal Transient Impedance Curve

Die 2

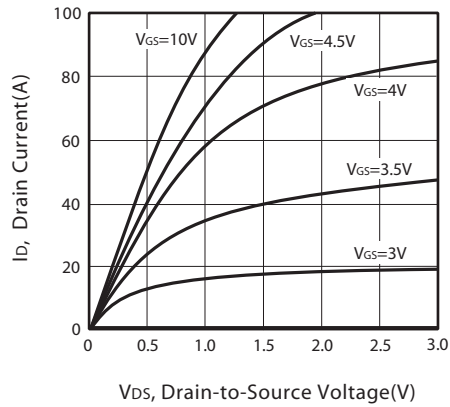


Figure 1. Output Characteristics

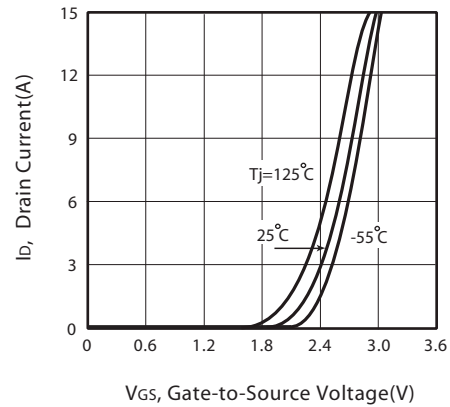


Figure 2. Transfer Characteristics

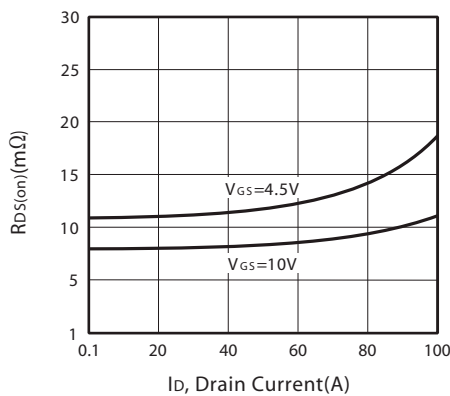


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

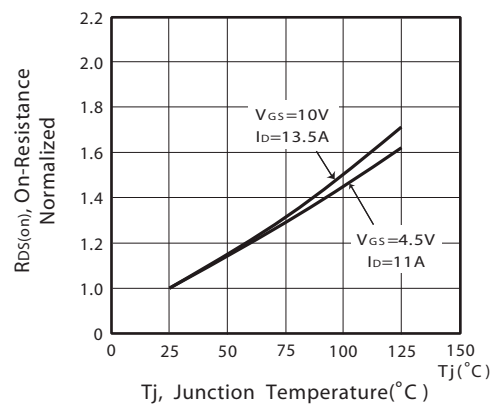


Figure 4. On-Resistance Variation with Drain Current and Temperature

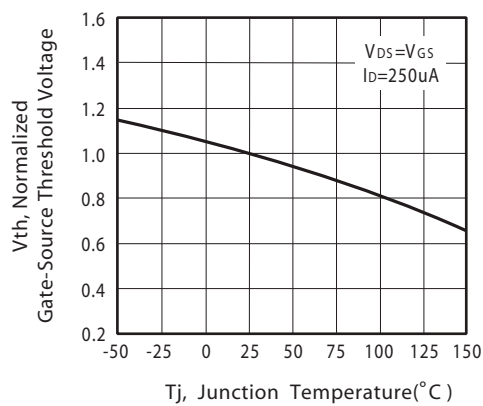


Figure 5. Gate Threshold Variation with Temperature

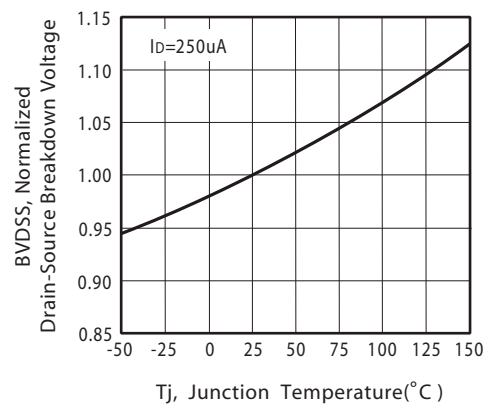


Figure 6. Breakdown Voltage Variation with Temperature

Die 2

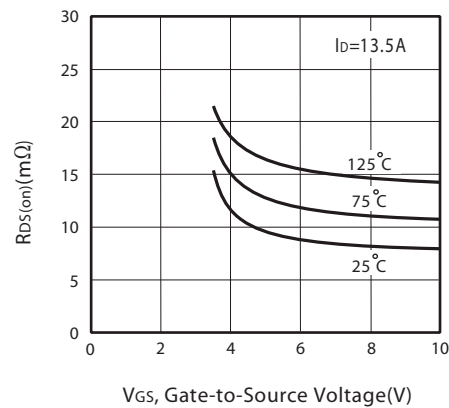


Figure 7. On-Resistance vs. Gate-Source Voltage

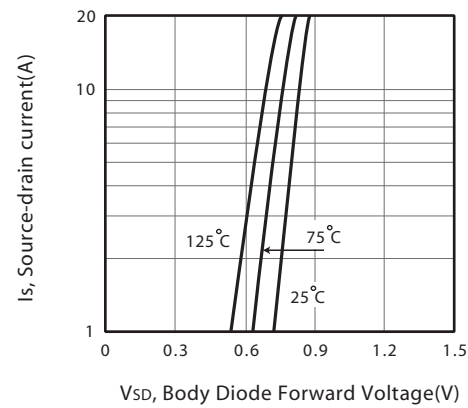


Figure 8. Body Diode Forward Voltage Variation with Source Current

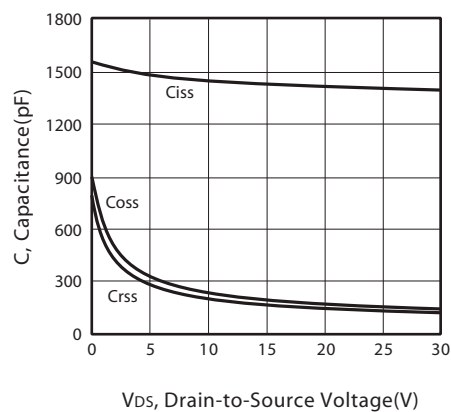


Figure 9. Capacitance

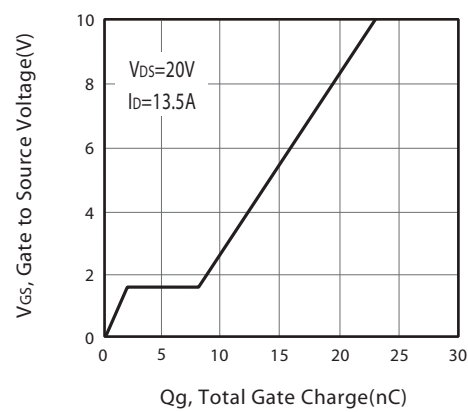


Figure 10. Gate Charge

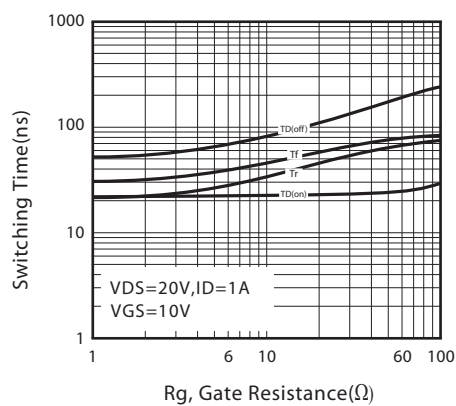


Figure 11. switching characteristics

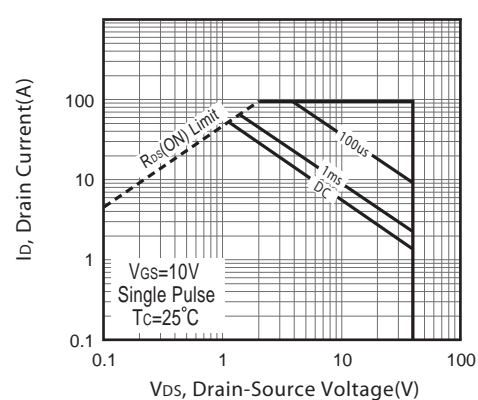
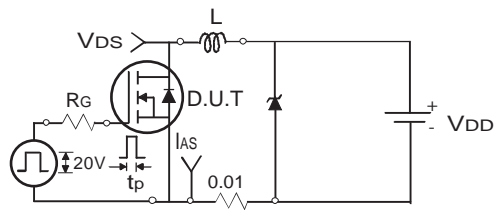


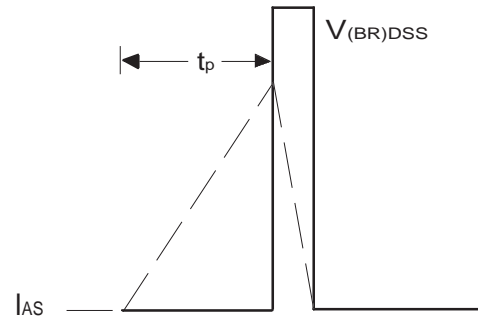
Figure 12. Maximum Safe Operating Area

Die 2



Uncamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

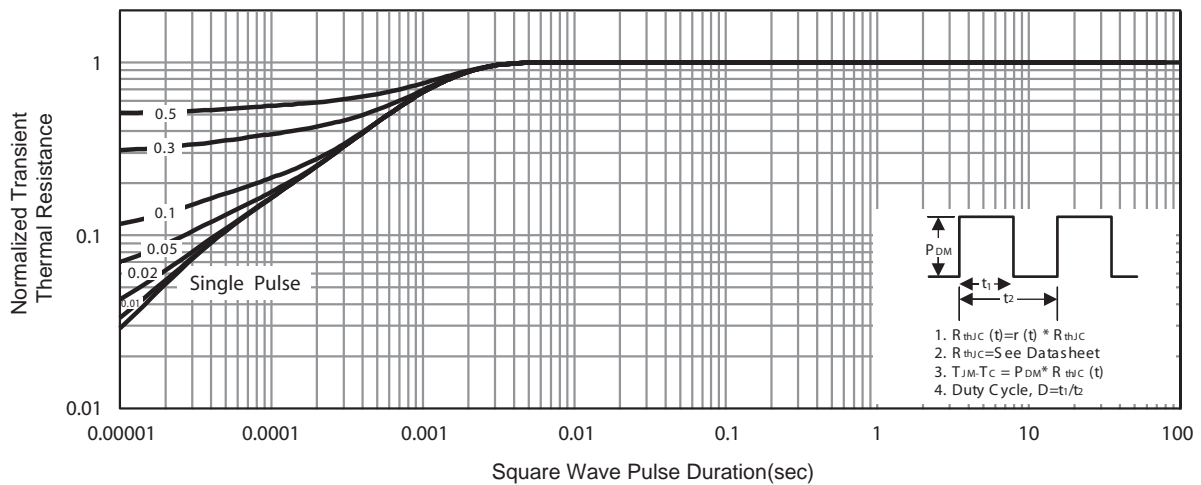
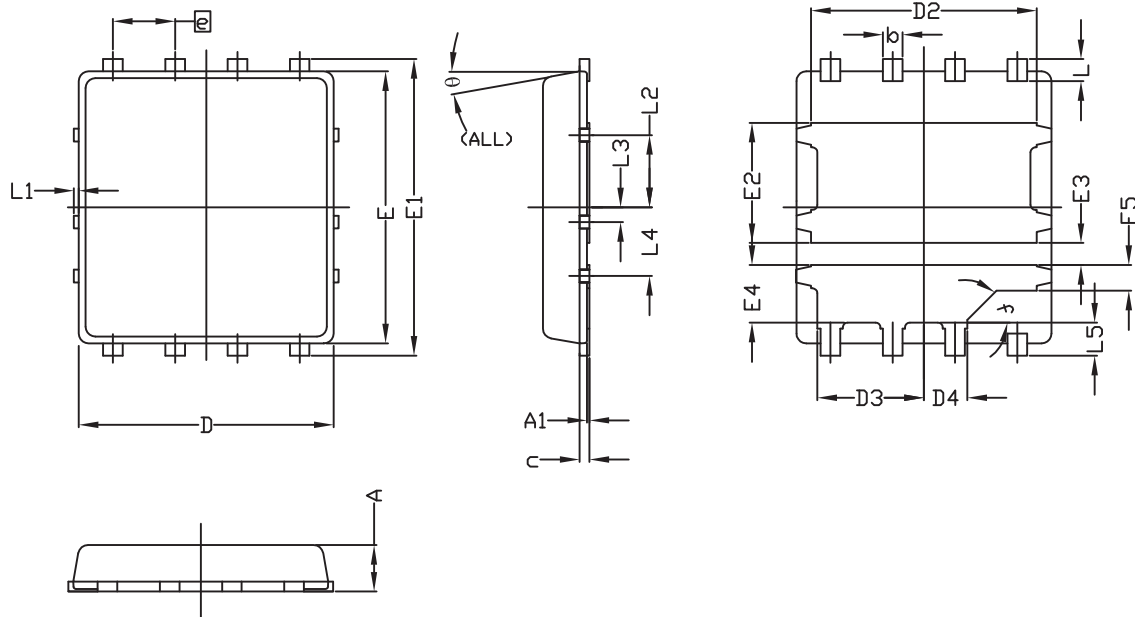


Figure 14. Normalized Thermal Transient Impedance Curve

PACKAGE OUTLINE DIMENSIONS

PDFN 5x6-8L



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.90	1.00	0.033	0.035	0.039
A1	0.00	—	0.05	0.000	—	0.002
b	0.35	0.40	0.45	0.014	0.016	0.018
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.20 BSC			0.205 BSC		
D2	4.50	4.60	4.70	0.177	0.181	0.185
D3	2.125	2.175	2.225	0.084	0.086	0.088
D4	0.835	0.885	0.935	0.033	0.035	0.037
E	5.55 BSC			0.219 BSC		
E1	6.05 BSC			0.238 BSC		
E2	2.40	2.45	2.50	0.094	0.096	0.098
E3	0.40	0.45	0.50	0.016	0.018	0.020
E4	1.125	1.175	1.225	0.044	0.046	0.048
E5	0.475	0.525	0.575	0.019	0.021	0.023
e	1.27 BSC			0.050 BSC		
L	0.35	0.45	0.55	0.014	0.018	0.022
L1	0.00	—	0.10	0.000	—	0.004
L2	1.375	1.475	1.575	0.054	0.058	0.062
L3	0.20	0.30	0.40	0.008	0.012	0.016
L4	1.30	1.40	1.50	0.051	0.055	0.059
L5	0.575	0.675	0.775	0.023	0.027	0.031
f	45°			45°		
θ	0°	—	10°	0°	—	10°

TOP MARKING DEFINITION

PDFN 5x6-8L

