

Asymmetric Dual N-Channel 30-V (D-S) MOSFET

Key Features:

- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Typical Applications:

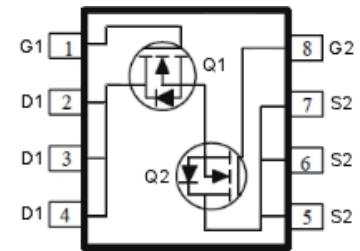
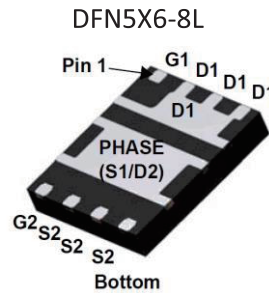
- DC/DC Conversion

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
Q1 30	8.5 @ $V_{GS} = 10V$	14
	16 @ $V_{GS} = 4.5V$	10
Q2 30	4 @ $V_{GS} = 10V$	20
	6 @ $V_{GS} = 4.5V$	17



RoHS
COMPLIANT
HALOGEN
FREE



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	Q1 Limit	Q2 Limit	Units
Drain-Source Voltage		V_{DS}	30	30	V
Gate-Source Voltage		V_{GS}	± 20	± 20	
Continuous Drain Current ^a	$T_A = 25^\circ\text{C}$	I_D	14	20	A
	$T_A = 70^\circ\text{C}$		11	16	
Pulsed Drain Current ^b		I_{DM}	50	50	
Continuous Source Current (Diode Conduction) ^a		I_S	3.3	3.4	A
Power Dissipation ^a	$T_A = 25^\circ\text{C}$	P_D	2.5	2.5	W
	$T_A = 70^\circ\text{C}$		1.6	1.6	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$t \leq 10 \text{ sec}$	$R_{\theta JA}$	50	$^\circ\text{C/W}$
	Steady State		90	

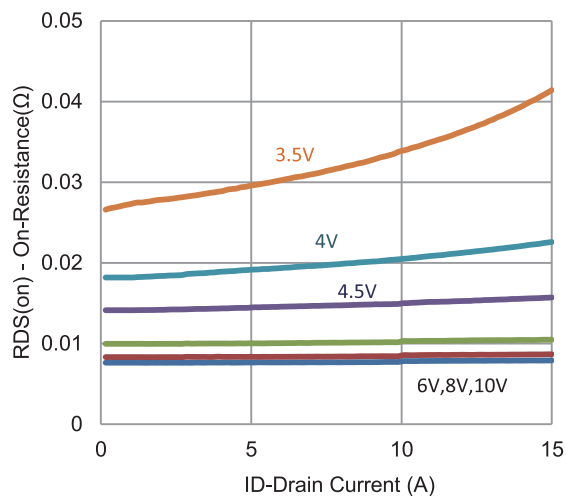
Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

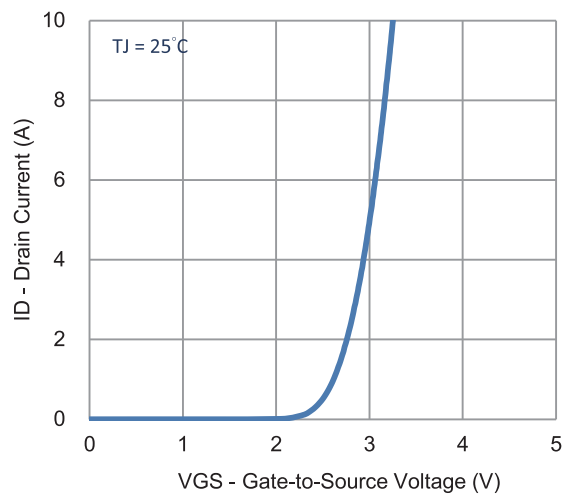
Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 uA (Q1)	1			V
		V _{DS} = V _{GS} , I _D = 250 uA (Q2)	1			V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V (Q1)			1	uA
		V _{DS} = 24 V, V _{GS} = 0 V (Q2)			1	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V (Q1)	20			A
		V _{DS} = 5 V, V _{GS} = 10 V (Q2)	20			A
Drain-Source On-Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 11.6 A (Q1)			8.5	mΩ
		V _{GS} = 4.5 V, I _D = 9.3 A (Q1)			16	
		V _{GS} = 10 V, I _D = 16.3 A (Q2)			4	mΩ
		V _{GS} = 4.5 V, I _D = 13 A (Q2)			6	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 11.6 A (Q1)		13		S
		V _{DS} = 15 V, I _D = 16.3 A (Q2)		15		S
Diode Forward Voltage ^a	V _{SD}	I _S = 1.6 A, V _{GS} = 0 V (Q1)		0.76		V
		I _S = 1.7 A, V _{GS} = 0 V (Q2)		0.73		V
Dynamic ^b						
Total Gate Charge	Q _g	Q1 V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 11.6 A		11		nC
Gate-Source Charge	Q _{gs}			5		
Gate-Drain Charge	Q _{gd}			3.5		
Turn-On Delay Time	t _{d(on)}	Q1 V _{DS} = 15 V, R _L = 1.3 Ω, I _D = 11.6 A, V _{GEN} = 10 V, R _{GEN} = 6 Ω		7		ns
Rise Time	t _r			6		
Turn-Off Delay Time	t _{d(off)}			28		
Fall Time	t _f			9		
Input Capacitance	C _{iss}	Q1 V _{DS} = 15 V, V _{GS} = 0 V, f = 1 Mhz		1379		pF
Output Capacitance	C _{oss}			156		
Reverse Transfer Capacitance	C _{rss}			116		
Total Gate Charge	Q _g	Q2 V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 16.3 A		35		nC
Gate-Source Charge	Q _{gs}			14		
Gate-Drain Charge	Q _{gd}			13		
Turn-On Delay Time	t _{d(on)}	Q2 V _{DS} = 15 V, R _L = 1 Ω, I _D = 16.3 A, V _{GEN} = 10 V, R _{GEN} = 6 Ω		11		ns
Rise Time	t _r			16		
Turn-Off Delay Time	t _{d(off)}			76		
Fall Time	t _f			27		
Input Capacitance	C _{iss}	Q2 V _{DS} = 15 V, V _{GS} = 0 V, f = 1 Mhz		5767		pF
Output Capacitance	C _{oss}			420		
Reverse Transfer Capacitance	C _{rss}			384		

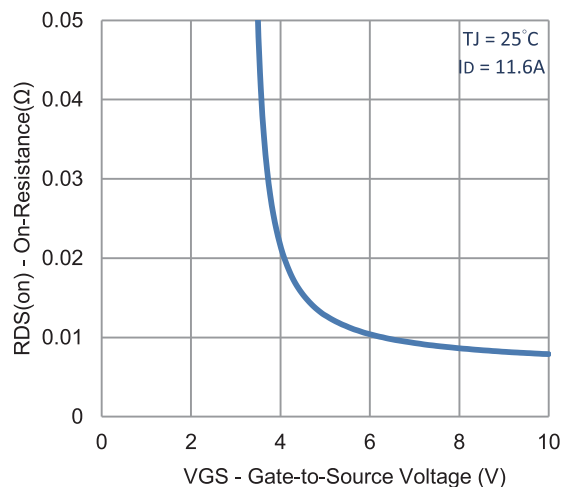
Typical Electrical Characteristics - Top Die



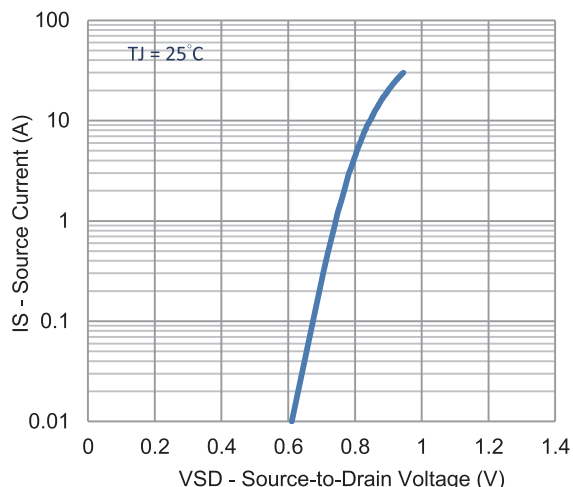
1. On-Resistance vs. Drain Current



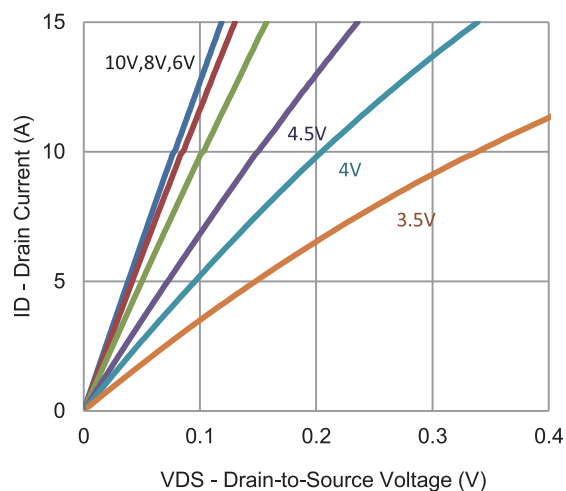
2. Transfer Characteristics



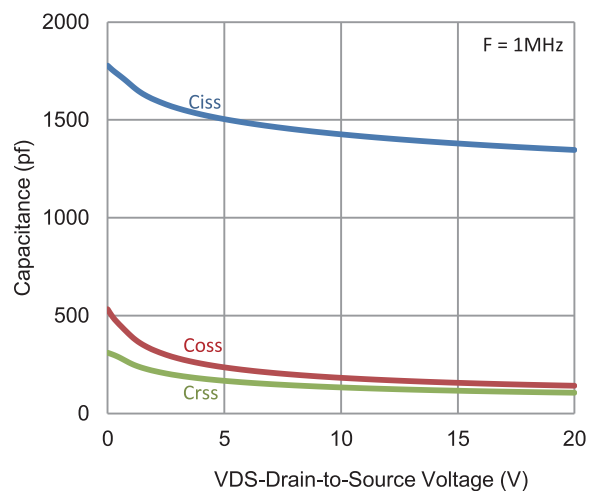
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

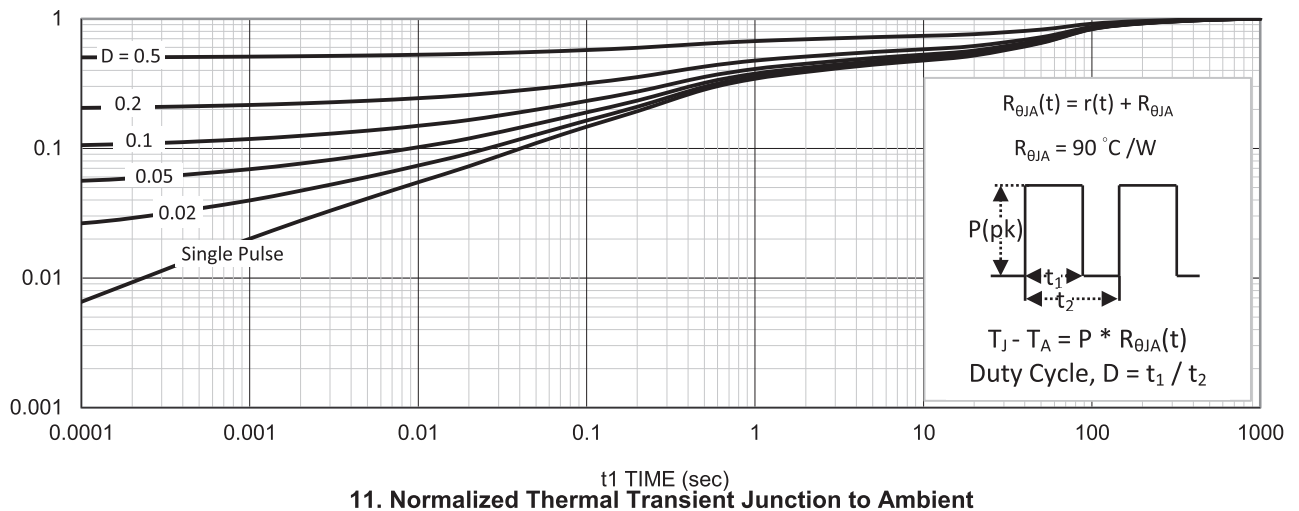
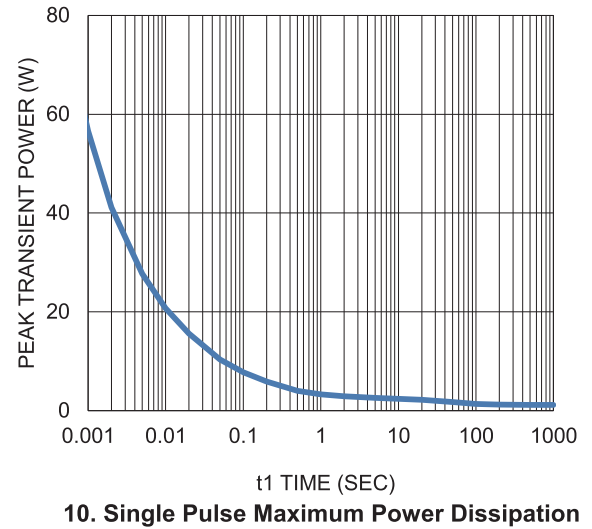
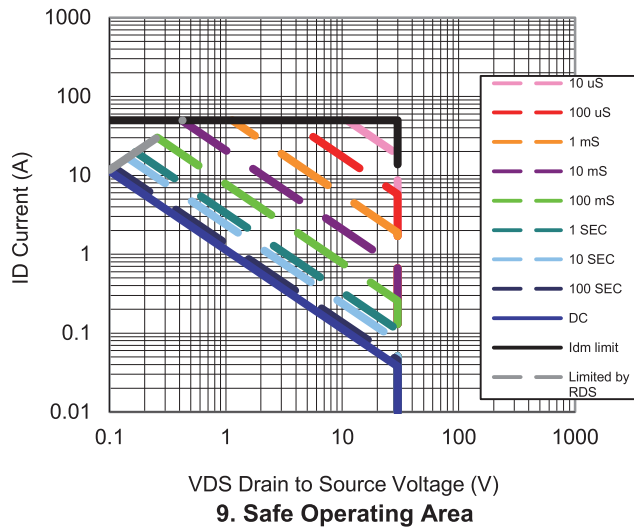
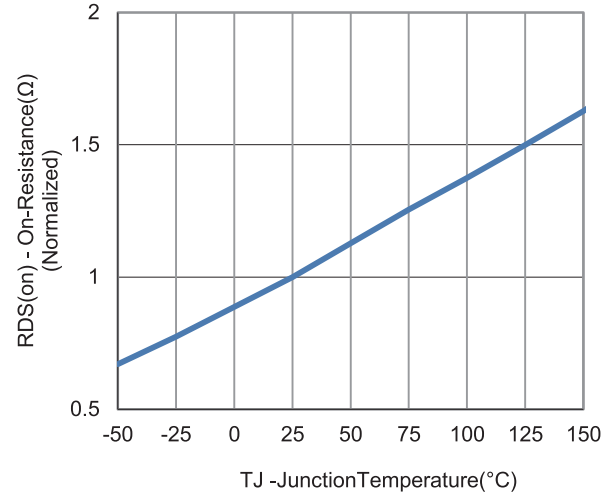
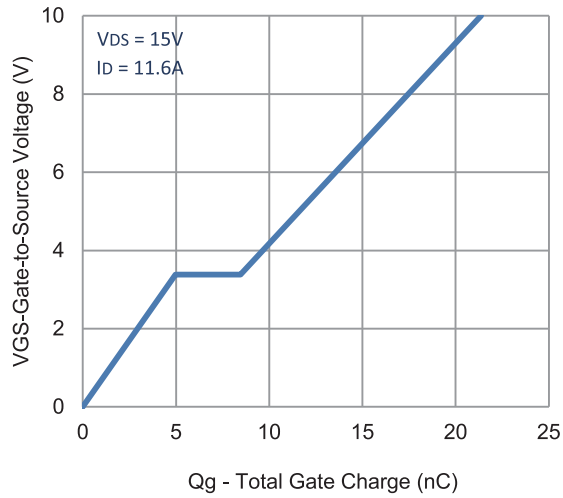


5. Output Characteristics

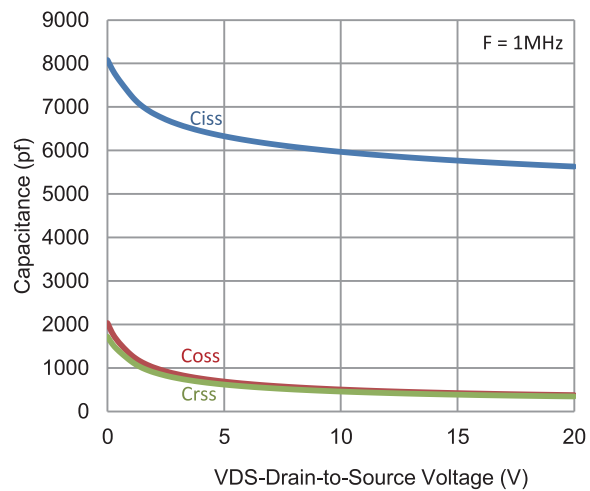
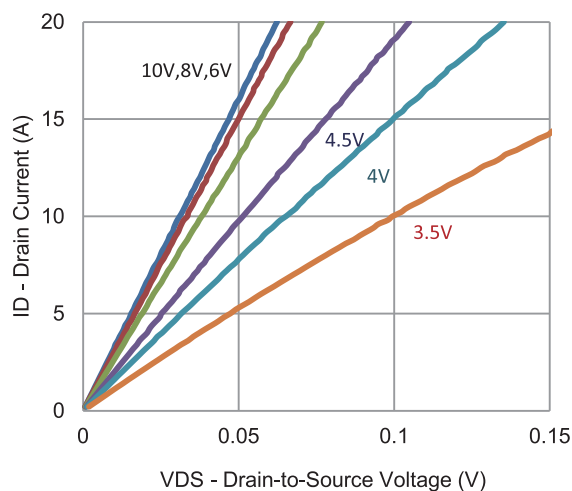
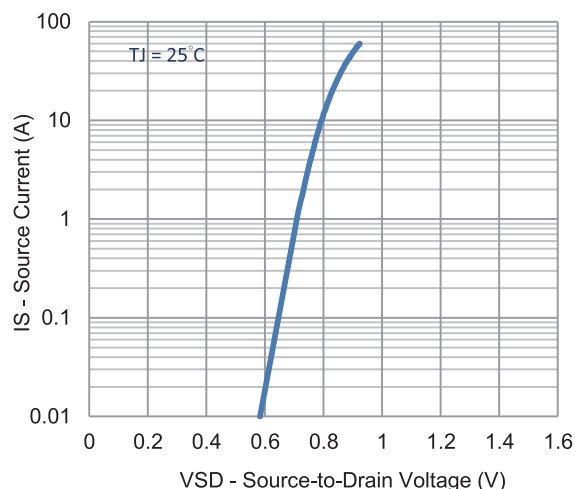
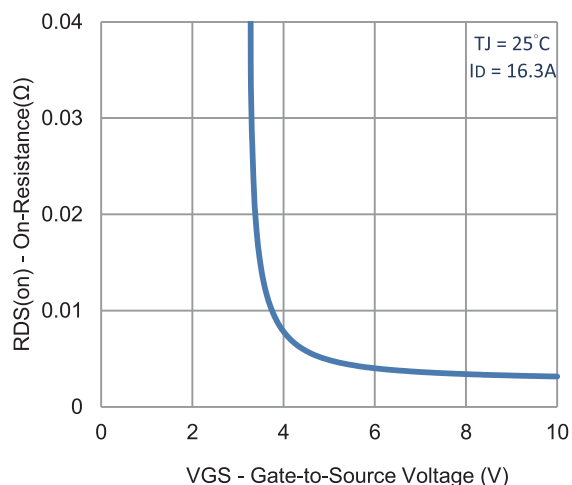
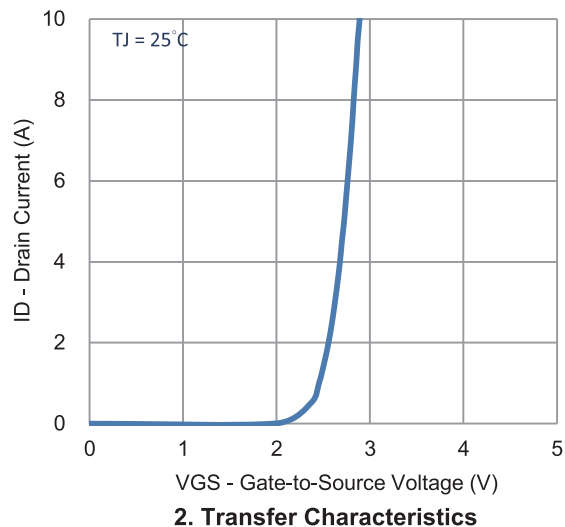
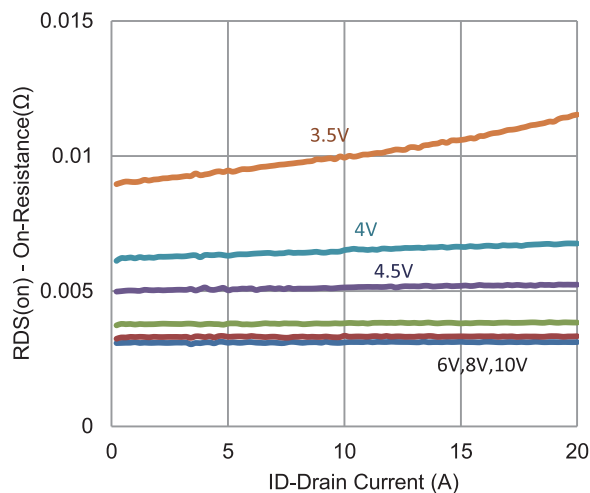


6. Capacitance

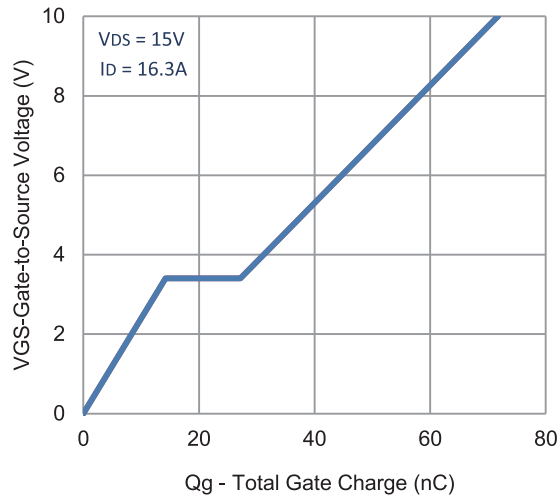
Typical Electrical Characteristics - Top Die



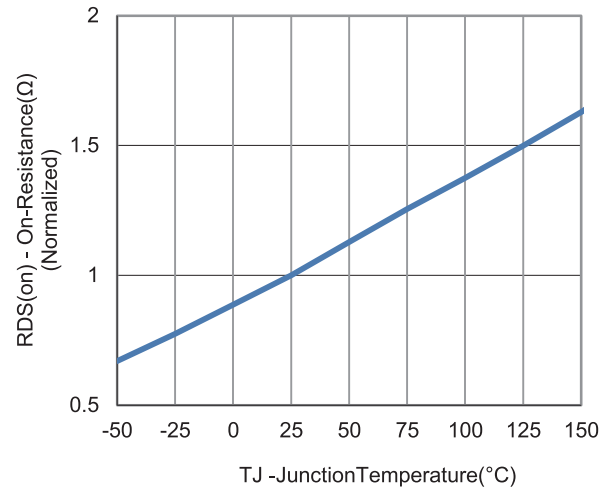
Typical Electrical Characteristics - Bottom Die



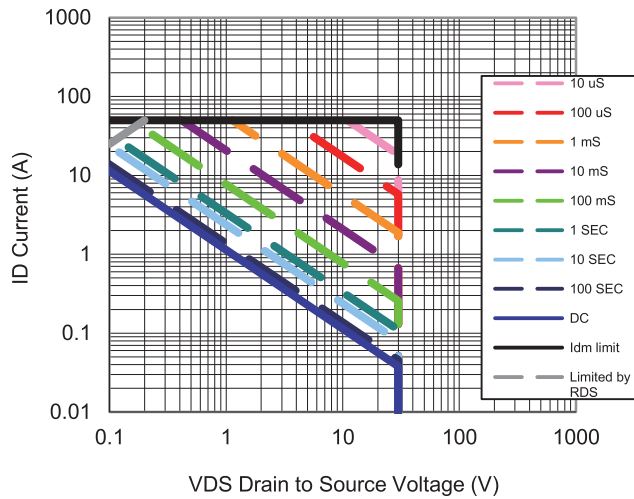
Typical Electrical Characteristics - Bottom Die



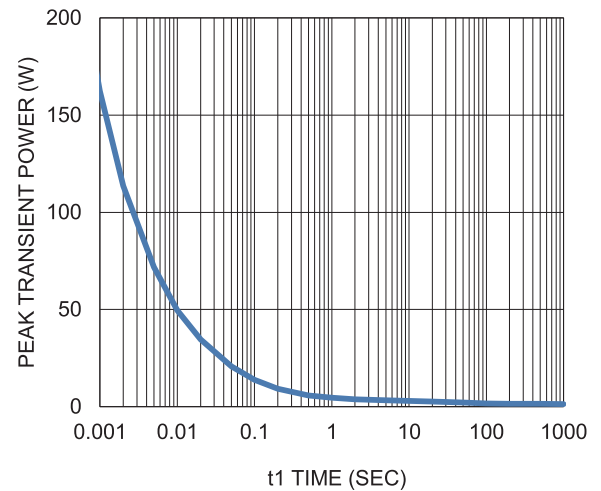
7. Gate Charge



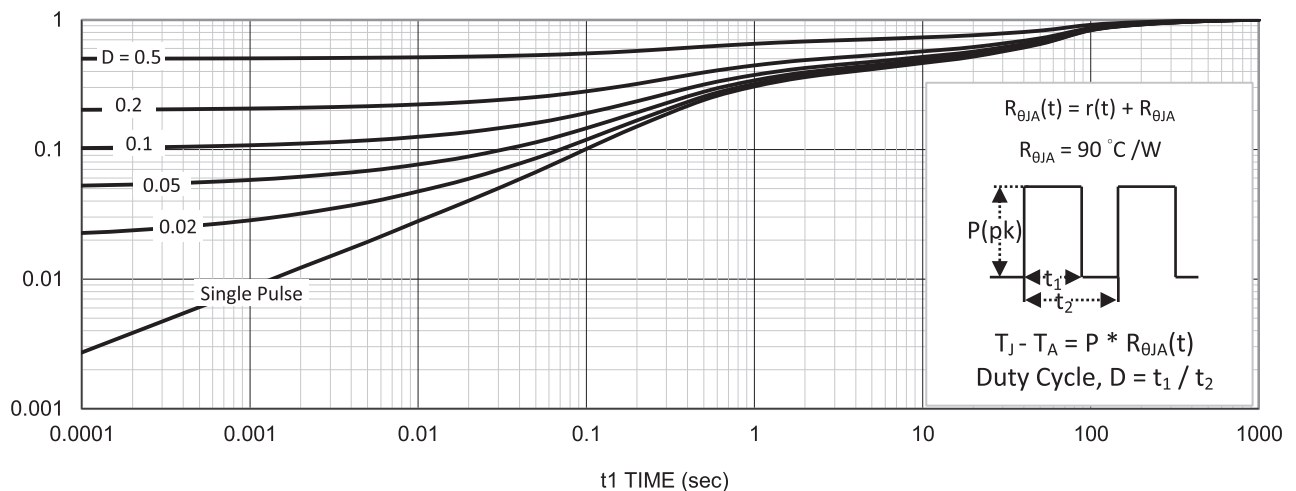
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

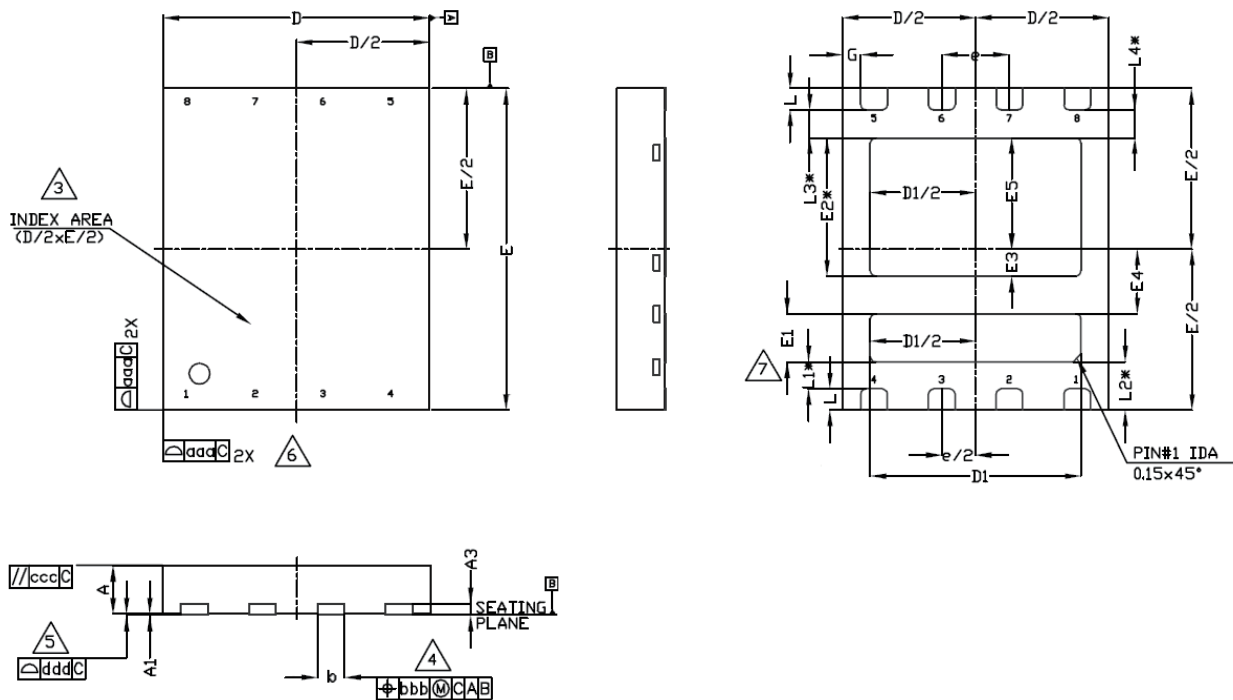


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOL	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	0.90	1.00	0.031	0.035	0.039
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3	----	0.203 REF	----	----	0.008 REF	----
b	0.45	0.50	0.55	0.018	0.020	0.022
D	5.00 BSC			0.197 BSC		
D1	3.80	3.95	4.05	0.078	0.084	0.088
E	6.00 BSC			0.236 BSC		
E1	0.75	0.90	1.00	0.030	0.035	0.039
E2	2.58 RFE			0.102 REF		
E3	0.35	0.50	0.60	0.014	0.020	0.024
E4	1.05	1.20	1.30	0.041	0.047	0.051
E5	1.93	2.08	2.18	0.076	0.082	0.086
e	1.27 BSC			0.050 BSC		
aaa	0.15			0.006		
bbb	0.10			0.004		
ccc	0.10			0.004		
ddd	0.08			0.003		
L	0.35	0.40	0.45	0.014	0.016	0.018
G	0.295	0.345	0.395	0.012	0.014	0.016
L1	0.50 REF			0.020 REF		
L2	0.90 REF			0.035 REF		
L3	0.52 REF			0.020 REF		
L4	0.92 REF			0.036 REF		