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

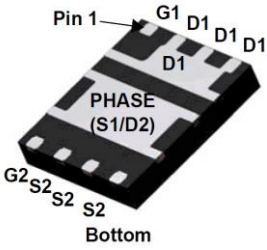
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

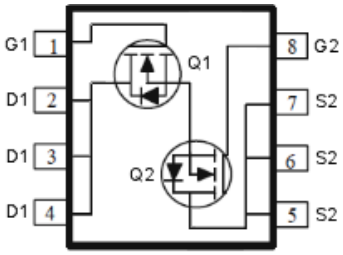
Typical Applications:
- DC/DC Conversion

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
Q1 30	9 @ V_{GS} = 10V	14
	15 @ V_{GS} = 4.5V	11
Q2 30	3.5 @ V_{GS} = 10V	22
	5.8 @ V_{GS} = 4.5V	17

Pb-free
RoHS COMPLIANT
HALOGEN FREE

DFN5X6-8L





ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C	I_D	14	20	A
	T_A=70°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°C	P_D	2.5	2.5	W
	T_A=70°C		1.6	1.6	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

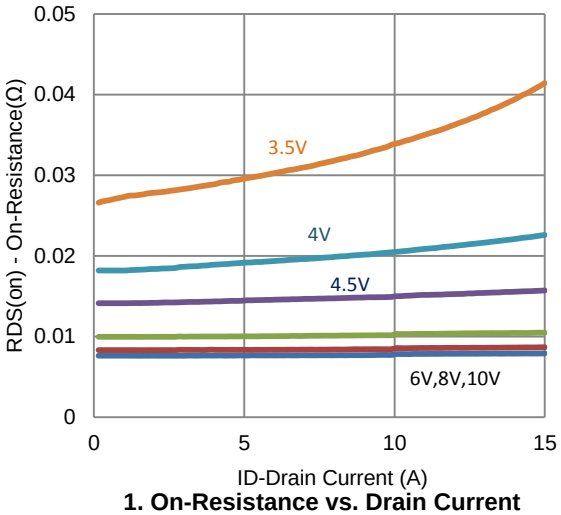
THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient [a]	t <= 10 sec	$R_{\theta JA}$	50	°C/W
	Steady State		90	

Notes
a. Surface Mounted on 1” x 1” FR4 Board.
b. Pulse width limited by maximum junction temperature

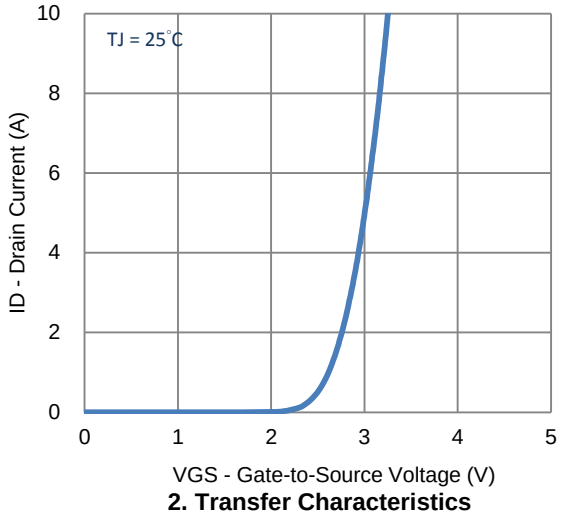
Electrical Characteristics

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)**			9	mΩ
		V_{GS} = 4.5 V, I_D = 9.3 A **(Q1)**			15	
		V_{GS} = 10 V, I_D = 16.3 A **(Q2)**			3.5	mΩ
		V_{GS} = 4.5 V, I_D = 13 A **(Q2)**			5.8	
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		

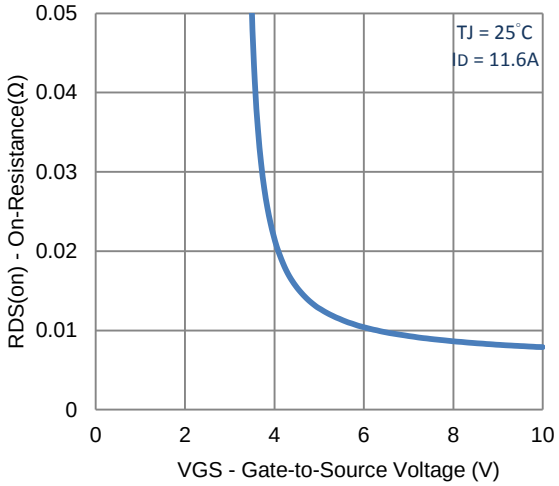
Typical Electrical Characteristics - Top Die



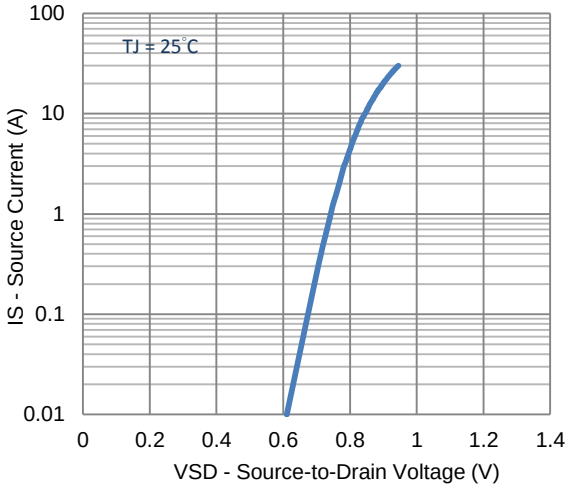
1. On-Resistance vs. Drain Current



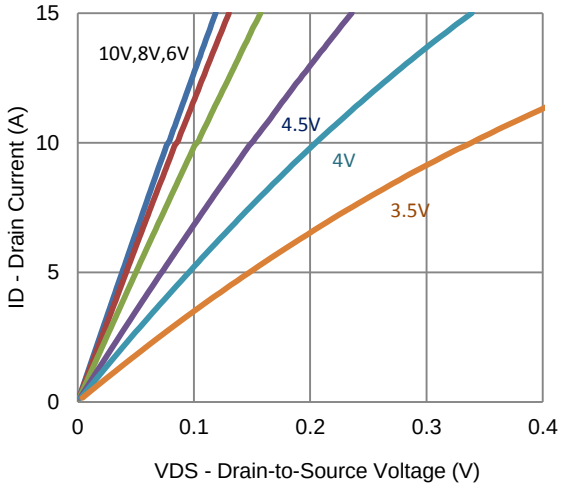
2. Transfer Characteristics



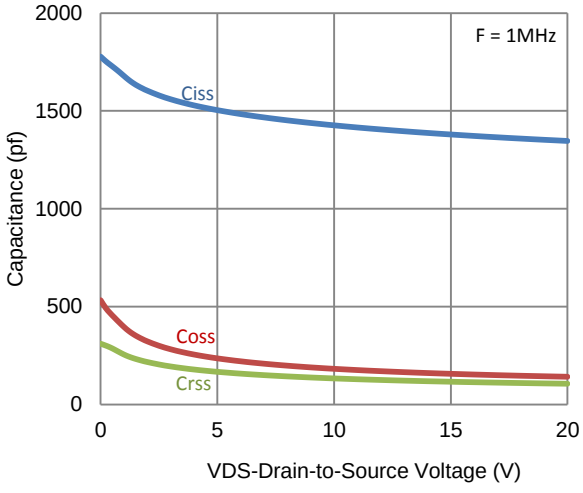
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

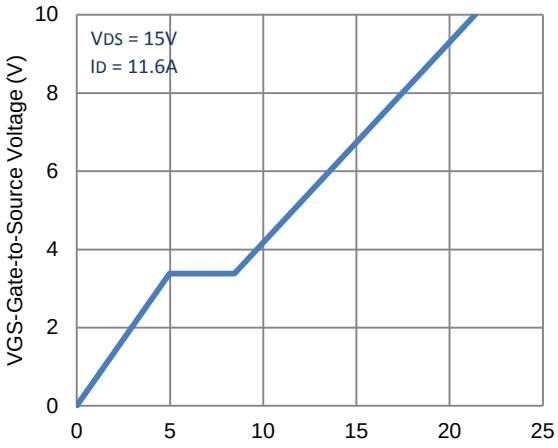


5. Output Characteristics

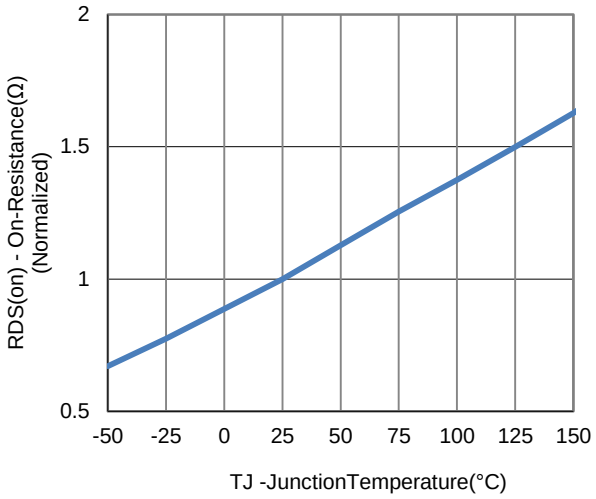


6. Capacitance

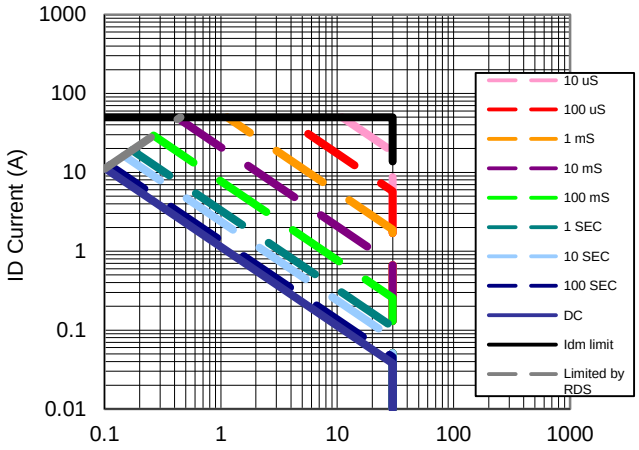
Typical Electrical Characteristics - Top Die



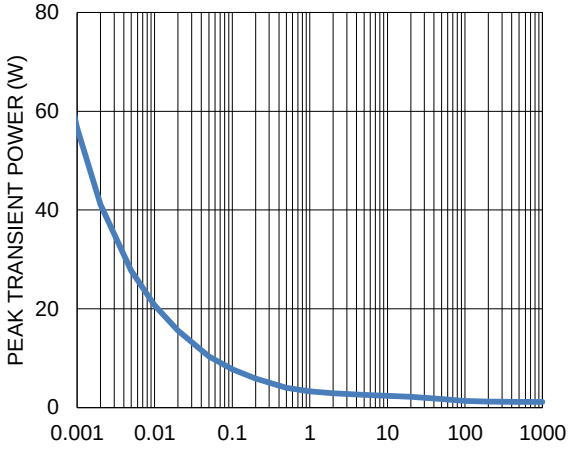
7. Gate Charge



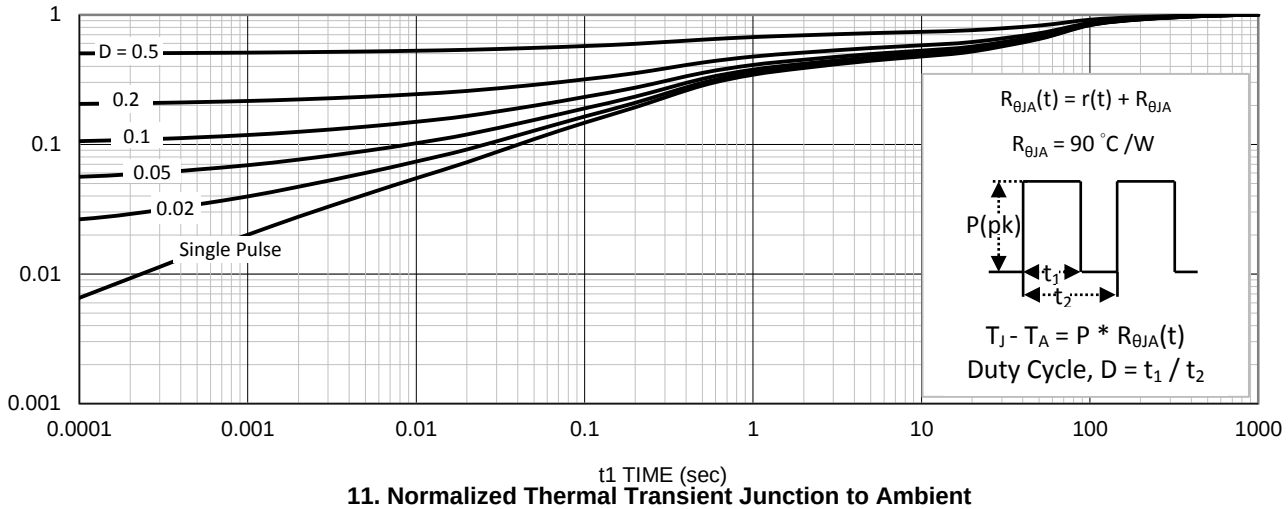
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

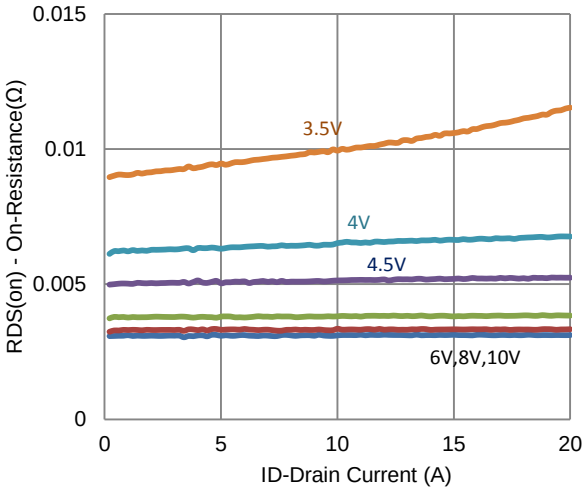


10. Single Pulse Maximum Power Dissipation

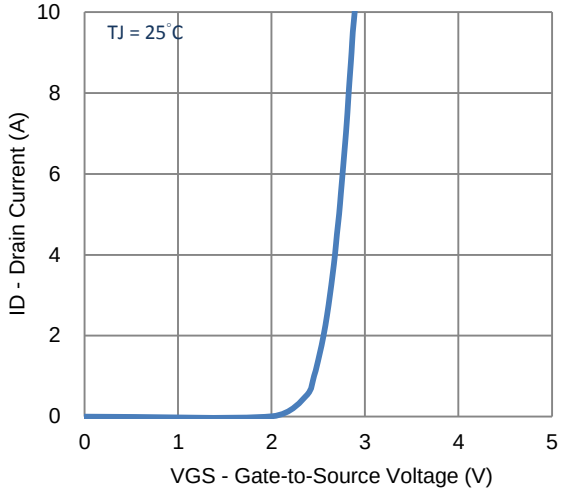


11. Normalized Thermal Transient Junction to Ambient

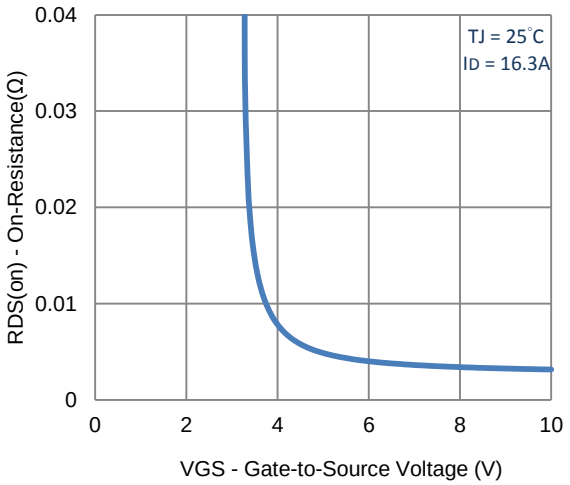
Typical Electrical Characteristics - Bottom Die



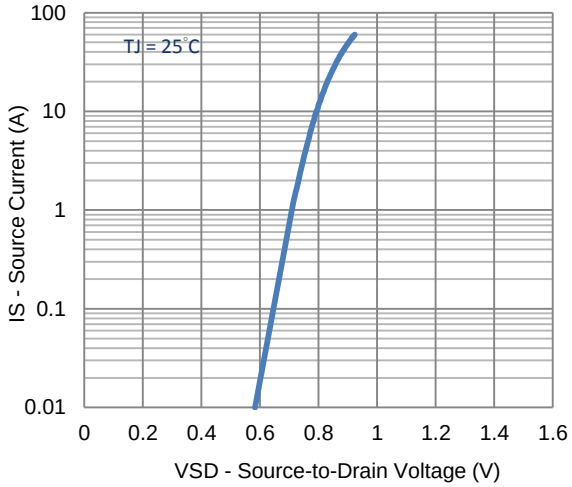
1. On-Resistance vs. Drain Current



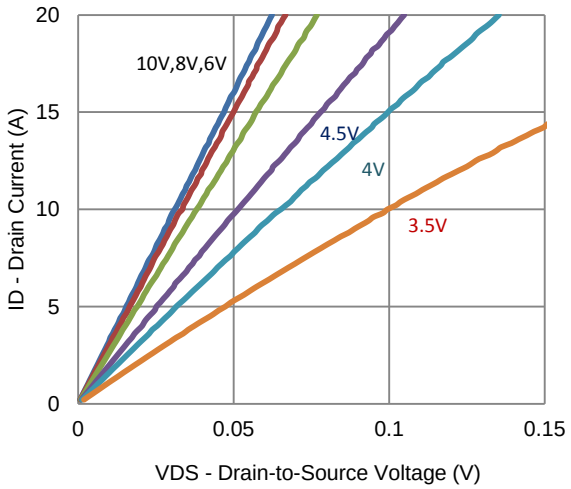
2. Transfer Characteristics



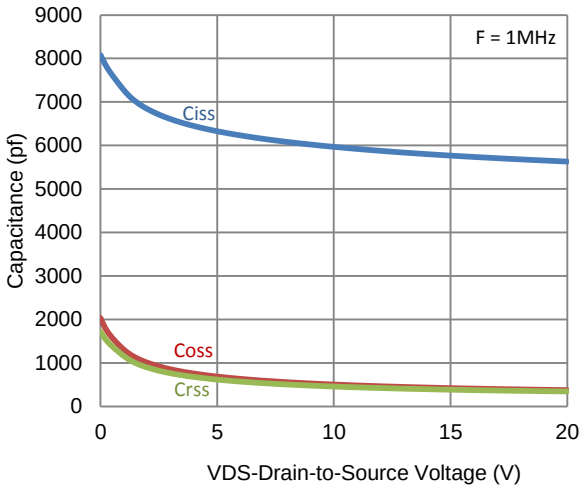
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage



5. Output Characteristics



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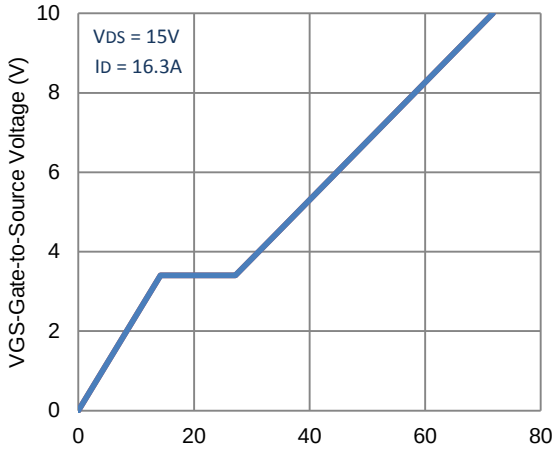
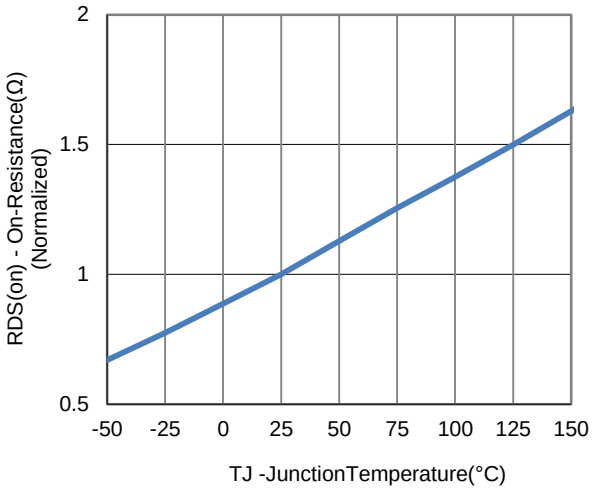
Typical Electrical Characteristics - Bottom Die



7. Gate Charge



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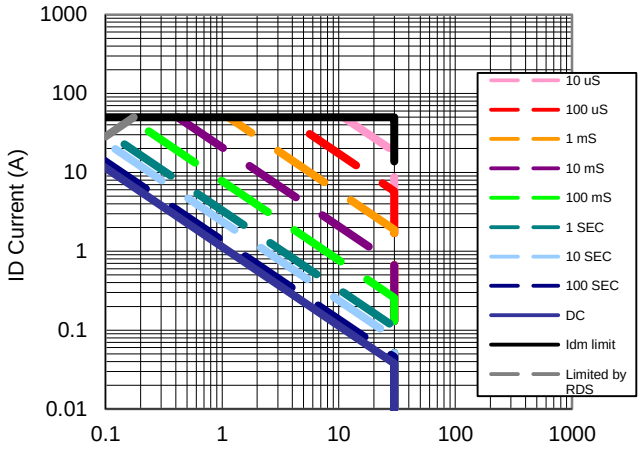
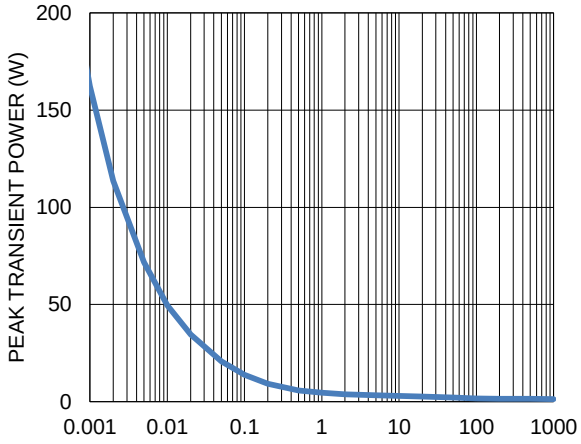


9. Safe Operating Area



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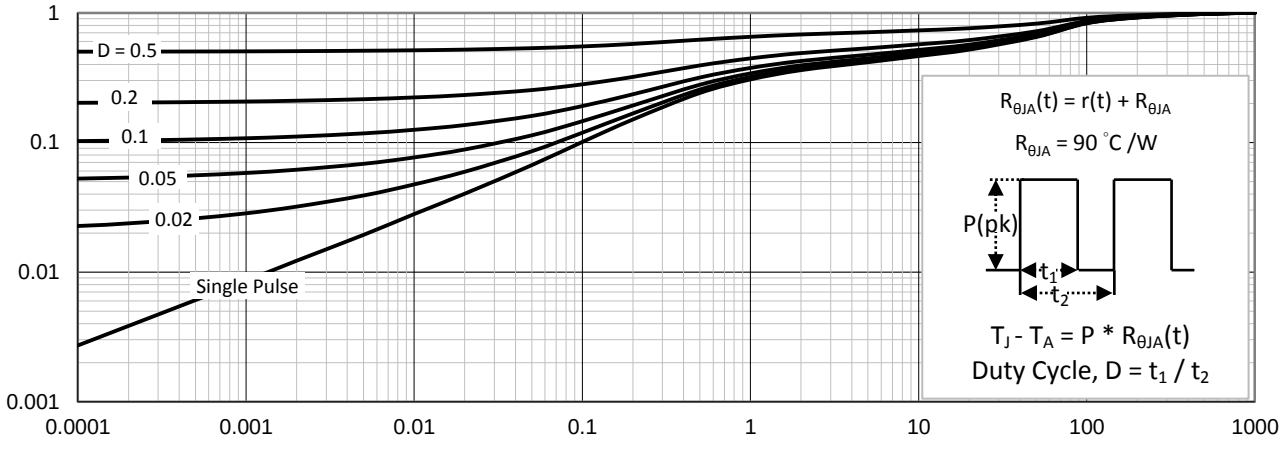
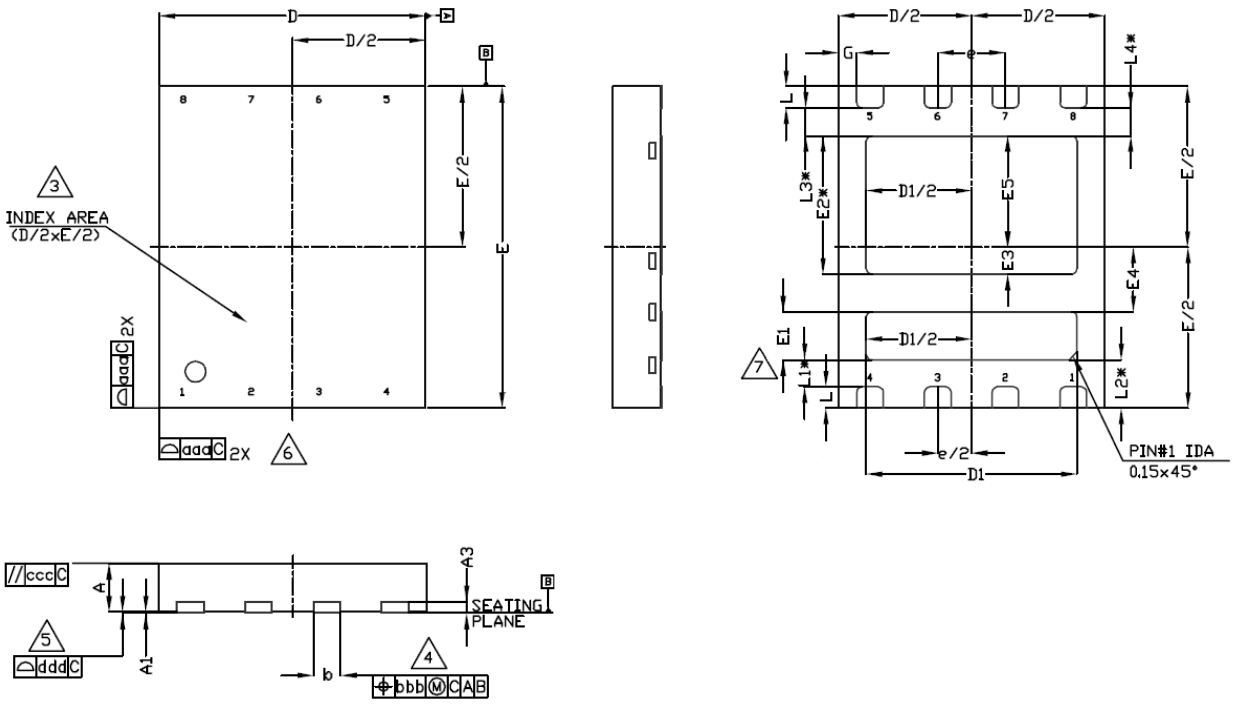


11. Normalized Thermal Transient Junction to Ambient

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 REF			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	