

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D	$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	18mΩ@10V	28A	-40V	35mΩ@-10V	-15A
	28mΩ@4.5V			45mΩ@-4.5V	

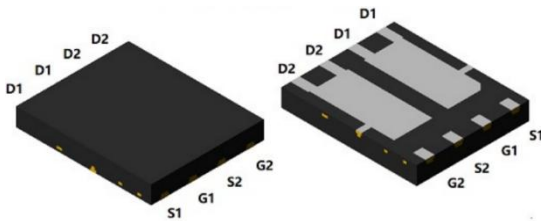
Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation
- Suffix “-Q1” for AEC-Q101

Application

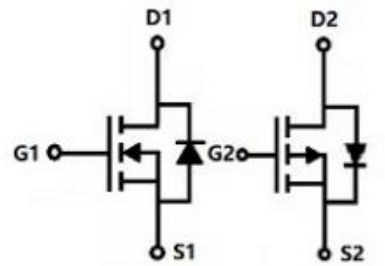
- H-bridge
- Inverters

Package

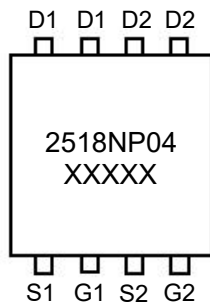


DFN5X6-8L

Circuit diagram



Marking



Absolute maximum ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	N-Channel	p-Channel	Unit
Drain-Source Voltage	V _{DS}	40	-40	V
Gate-Source Voltage	V _{GS}	±20	±20	V
Continuous Drain Current	I _D	28	-15	A
Pulsed Drain Current ¹⁾	I _{DM}	70	-60	A
Power Dissipation	P _D	35	35	W
Thermal Resistance, Junction-to-Case ²⁾	R _{θjc}	3.6	3.6	°C/W
Junction Temperature	T _J	-55 ~ +150		°C
Storage Temperature	T _{STG}	-55 ~ +150		°C

N-CH Electrical characteristics (Tc=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 40V, V _{GS} = 0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.4	2.0	V
Drain-source on-resistance ³⁾	R _{DS(on)}	V _{GS} = 10V, I _D = 15A		15	18	mΩ
		V _{GS} = 4.5V, I _D = 10A		22	28	mΩ
Dynamic characteristics⁴⁾						
Input Capacitance	C _{iss}	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz		964		pF
Output Capacitance	C _{oss}			109		
Reverse Transfer Capacitance	C _{rss}			96		
Total Gate Charge	Q _g	V _{DS} = 20V, V _{GS} = 10V, I _D = 15A		22.9		nC
Gate-Source Charge	Q _{gs}			3.5		
Gate-Drain Charge	Q _{gd}			5.3		
Turn-on delay time	t _{d(on)}	V _{DD} = 20V, V _{GS} = 10V, R _L = 2.5Ω, R _{GEN} = 3Ω		5.5		nS
Turn-on rise time	t _r			14		
Turn-off delay time	t _{d(off)}			24		
Turn-off fall time	t _f			12		
Source-Drain Diode characteristics						
Diode Forward Current ²⁾	I _S				28	A
Diode Forward voltage ³⁾	V _{DS}	V _{GS} = 0V, I _S = 15A			1.2	V

P-CH Electrical characteristics (Tc=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -40V, V_{GS} = 0V$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.5	-2.0	V
Drain-source on-resistance ³⁾	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -7A$		29	35	m Ω
		$V_{GS} = -4.5V, I_D = -4A$		34	45	m Ω
Dynamic characteristics⁴⁾						
Input Capacitance	C_{iss}	$V_{DS} = -20V, V_{GS} = 0V, f = 1MHz$		964		pF
Output Capacitance	C_{oss}			109		
Reverse Transfer Capacitance	C_{rss}			96		
Total Gate Charge	Q_g	$V_{DS} = -20V, V_{GS} = -10V, I_D = -7A$		22.9		nC
Gate-Source Charge	Q_{gs}			3.5		
Gate-Drain Charge	Q_{gd}			5.3		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -20V, V_{GS} = -10V, R_L = 2.3\Omega, R_{GEN} = 6\Omega$		5.5		nS
Turn-on rise time	t_r			14		
Turn-off delay time	$t_{d(off)}$			24		
Turn-off fall time	t_f			12		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				-15	A
Diode Forward voltage ³⁾	V_{DS}	$V_{GS} = 0V, I_S = -10A$			-1.2	V

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2) Surface Mounted on FR4 Board, $t \leq 10$ sec.
- 3) Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- 4) Guaranteed by design, not subject to production

N- Channel Typical Characteristics

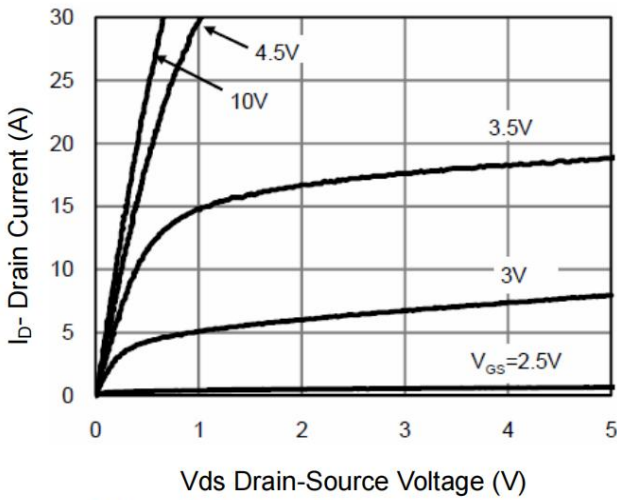


Figure1 Output Characteristics

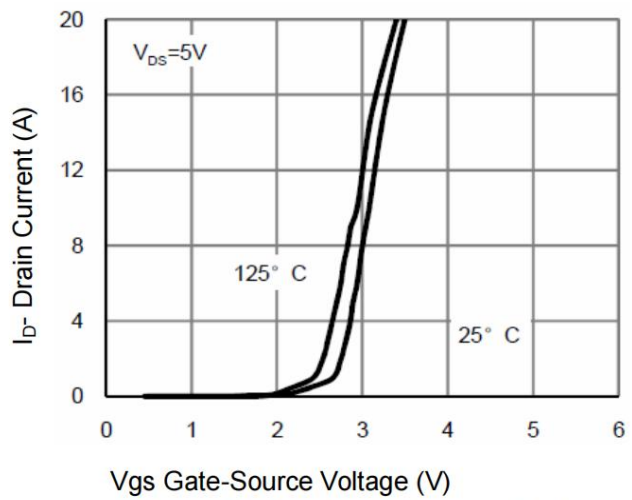


Figure 2 Transfer Characteristics

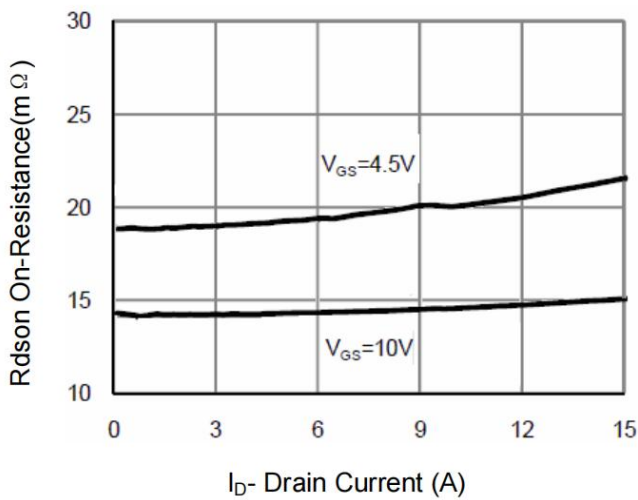


Figure 3 Drain-Source On-Resistance

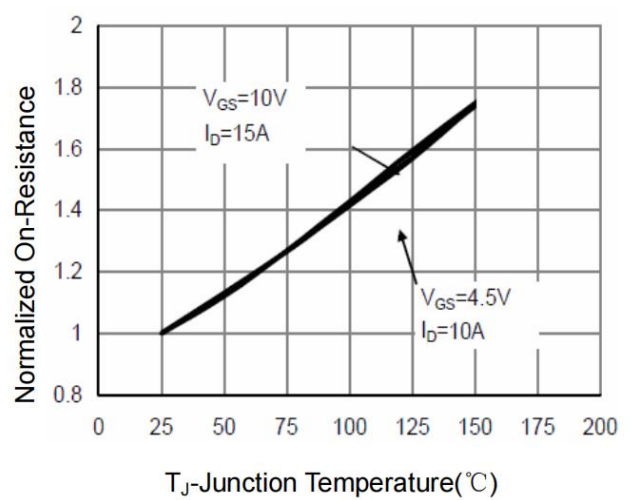


Figure 4 Drain-Source On-Resistance

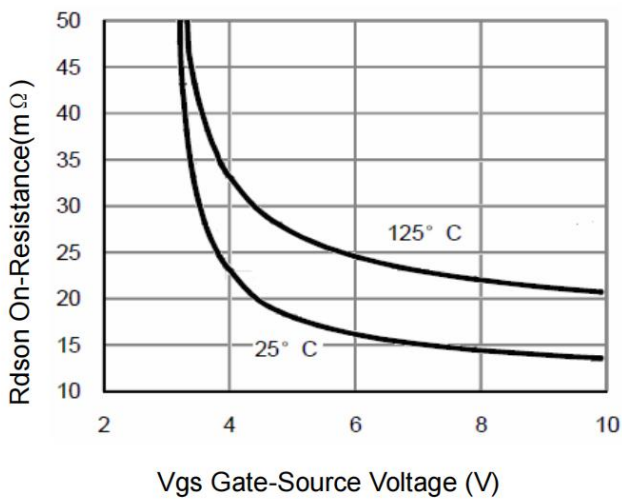


Figure5 Rdson vs Vgs

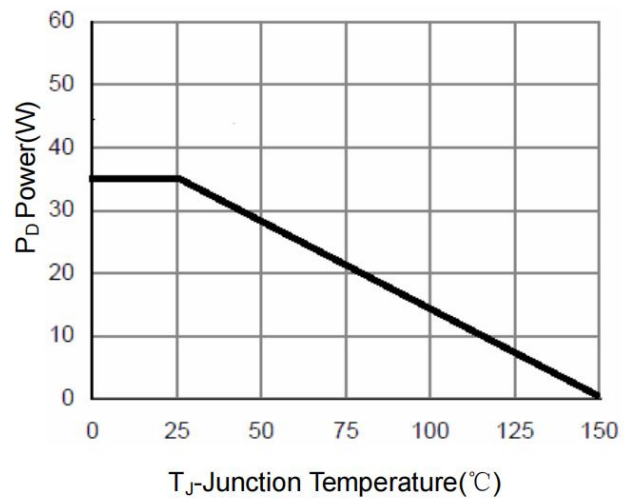


Figure 6 Power Dissipation

N- Channel Typical Characteristics

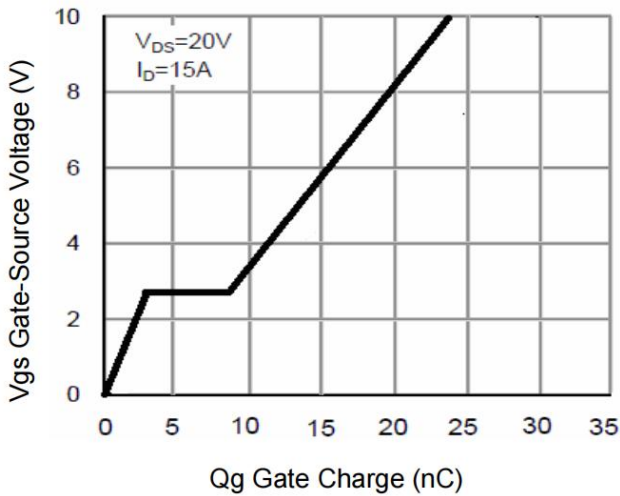


Figure 7 Gate Charge

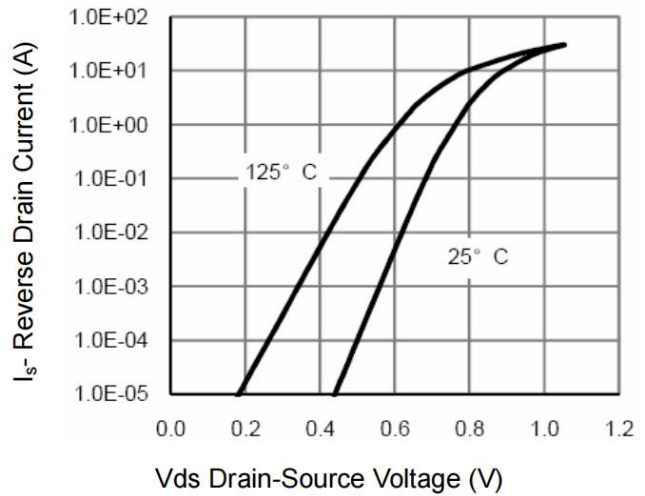


Figure 8 Source- Drain Diode Forward

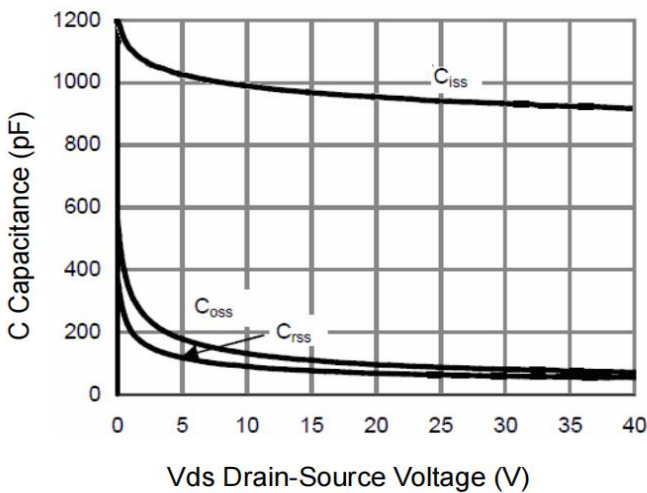


Figure 9 Capacitance vs Vds

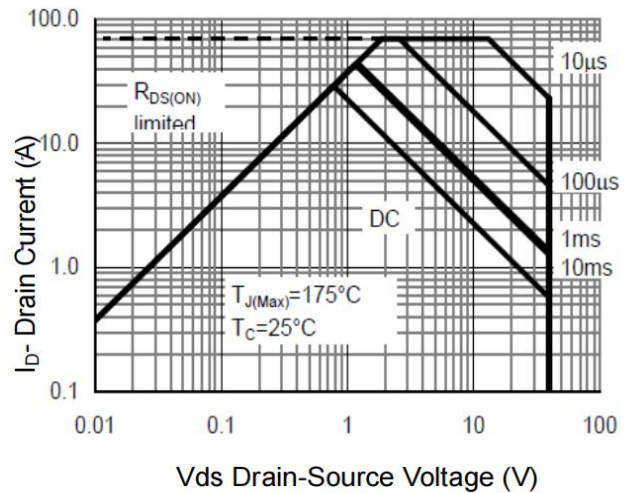


Figure 10 Safe Operation Area

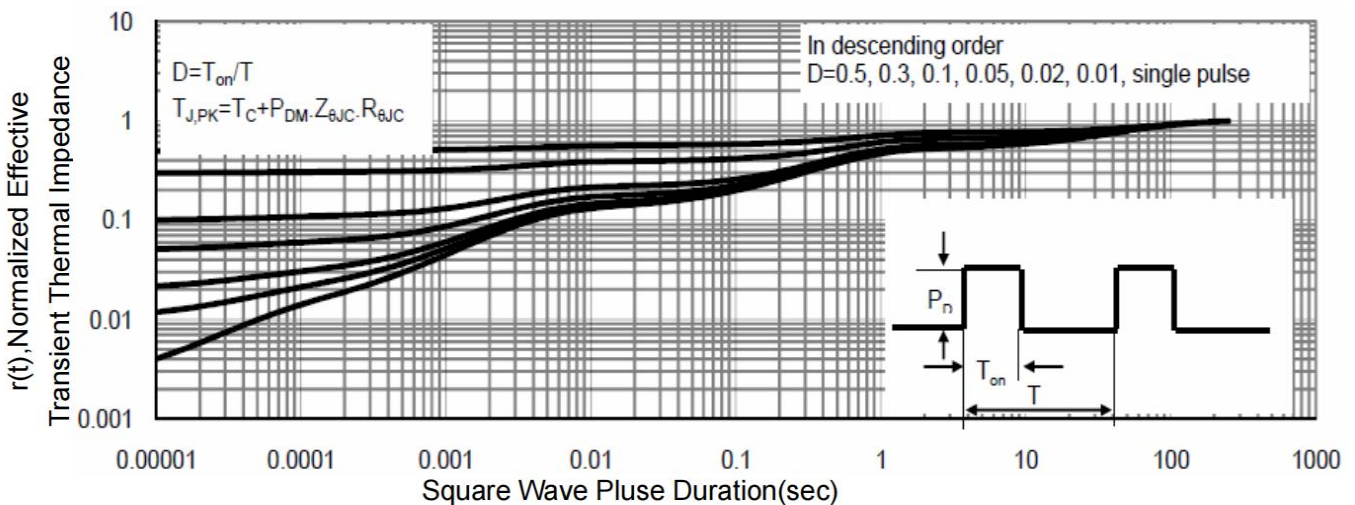


Figure 11 Normalized Maximum Transient Thermal Impedance

P- Channel Typical Characteristics

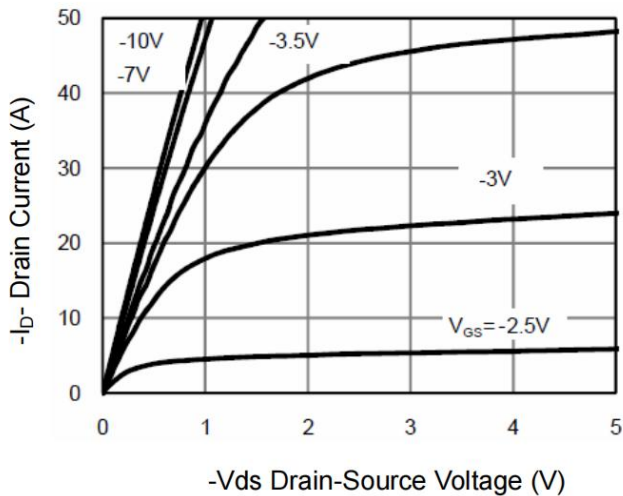


Figure 1 Output Characteristics

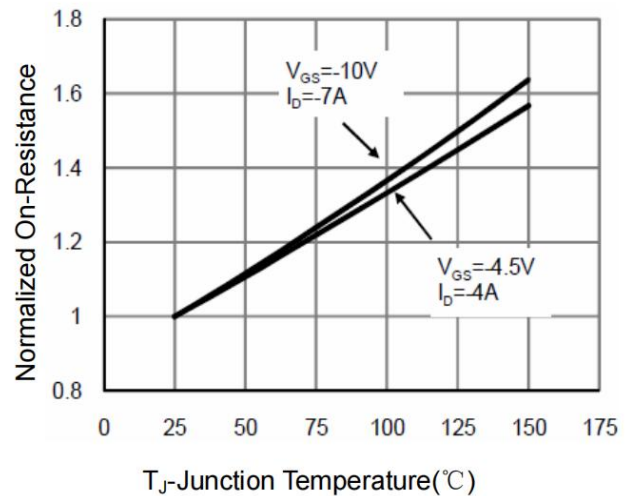


Figure 2 Rdson-Junction Temperature

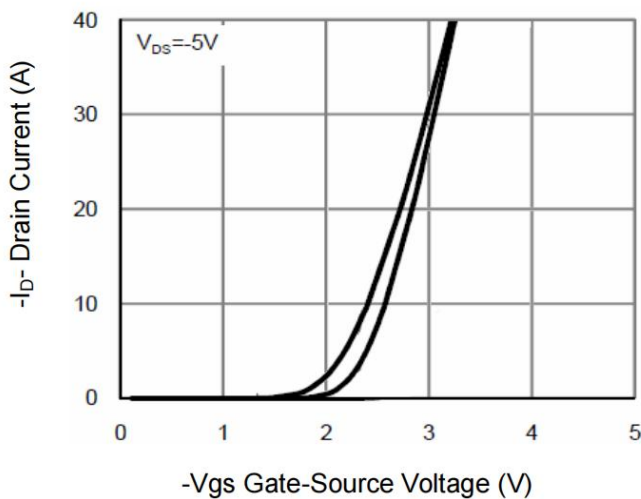


Figure 3 Transfer Characteristics

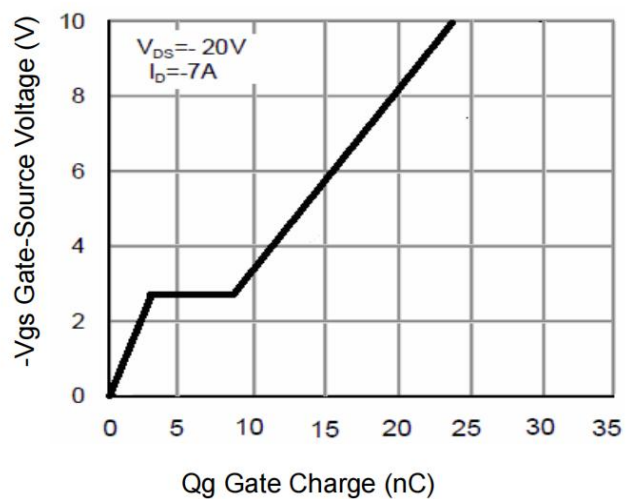


Figure 4 Gate Charge

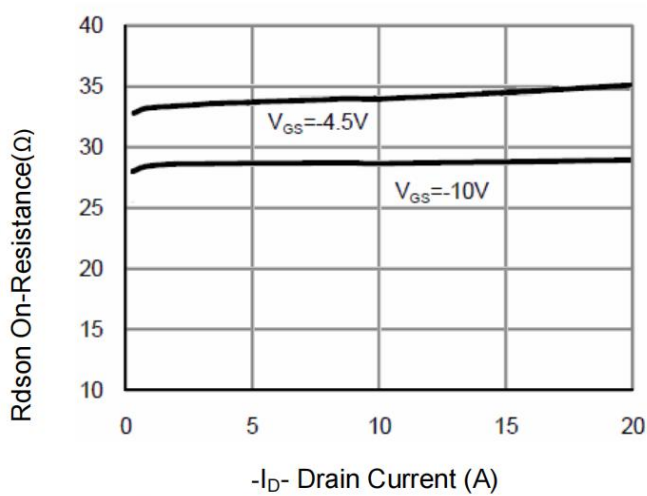


Figure 5 Rdson- Drain Current

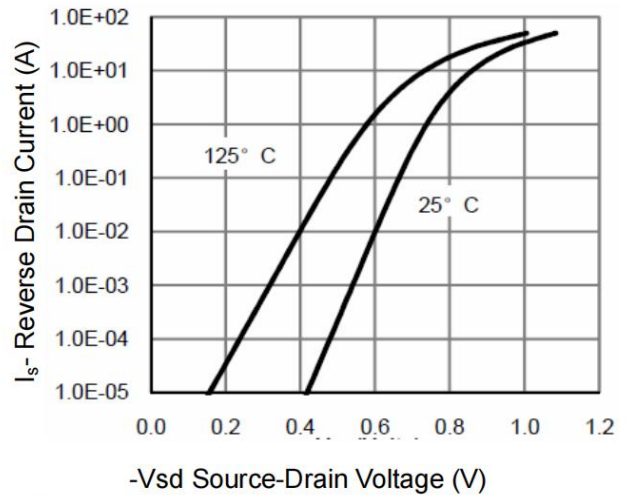


Figure 6 Source- Drain Diode Forward

P- Channel Typical Characteristics

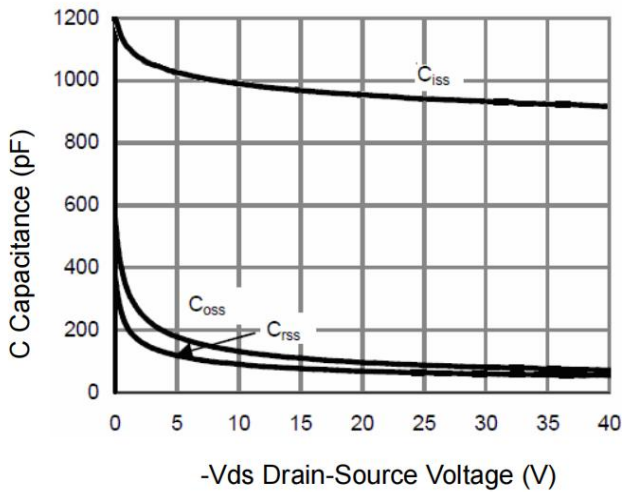


Figure 7 Capacitance vs Vds

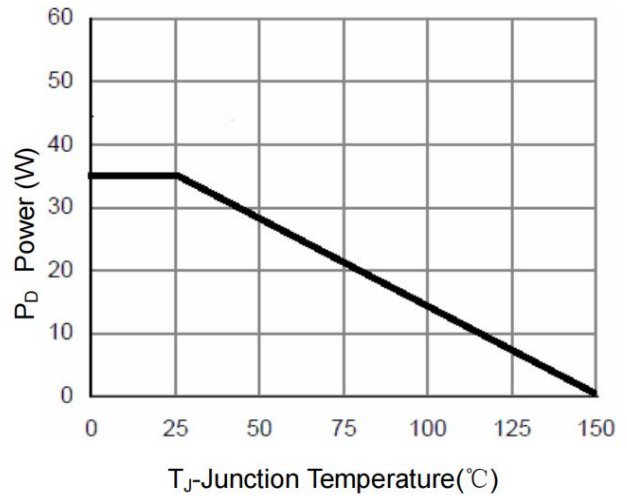


Figure 8 Power Dissipation

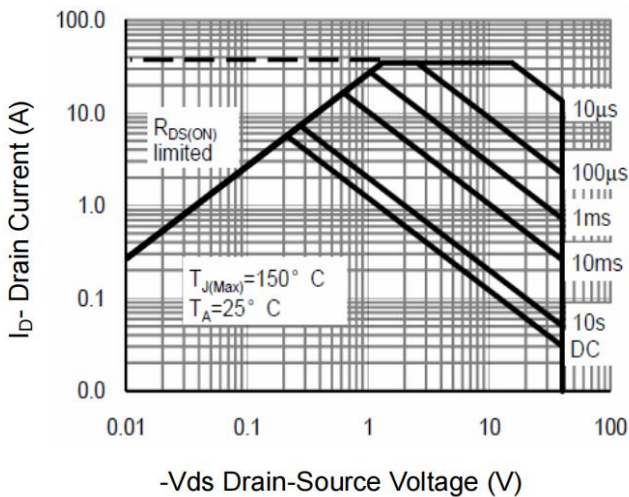


Figure 9 Safe Operation Area

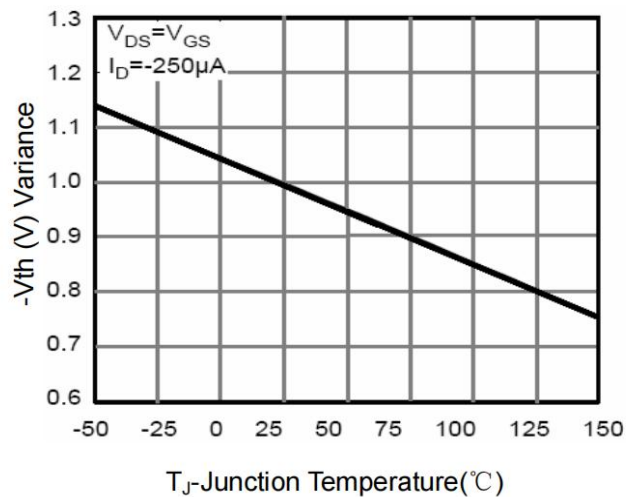


Figure 10 V_{GS(th)} vs Junction Temperature

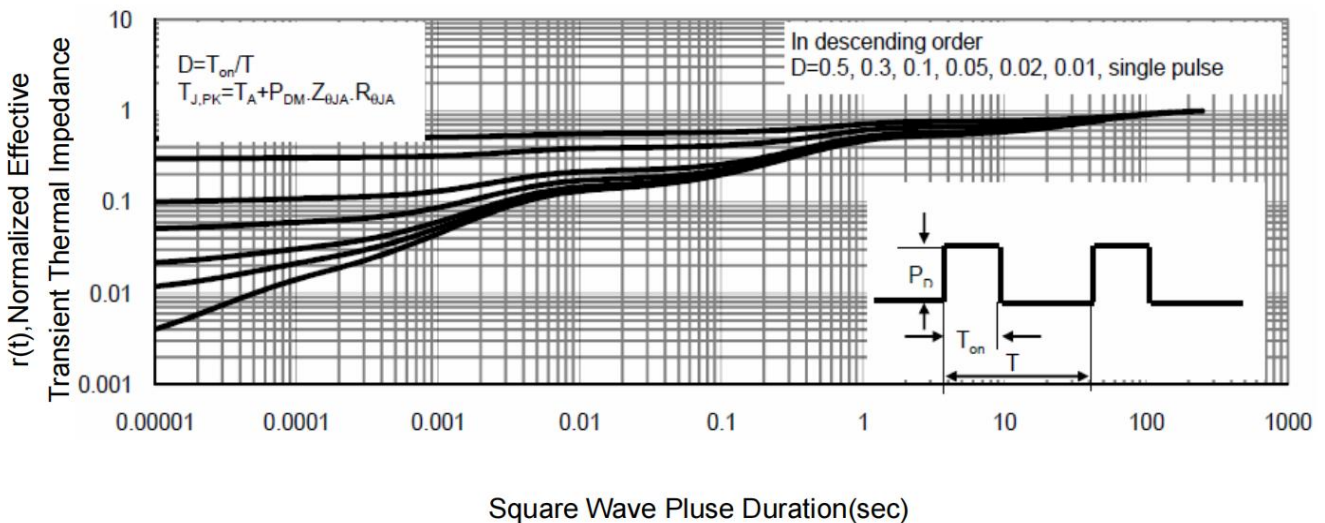
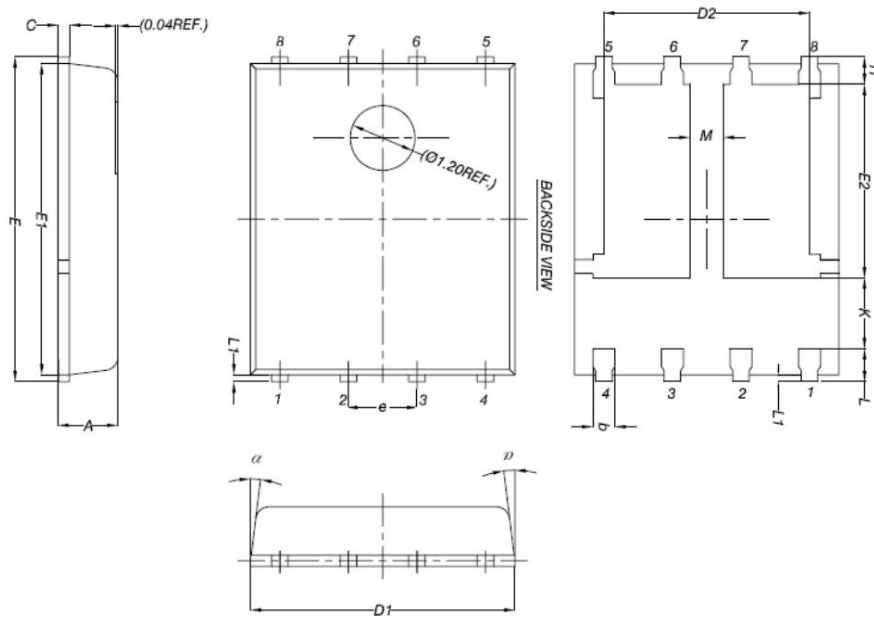


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
b	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.012
D1	4.800	5.000	0.188	0.197
D2	3.610	3.960	0.142	0.156
E	5.900	6.100	0.232	0.240
E1	5.700	5.800	0.224	0.228
E2	3.380	3.780	0.133	0.149
e	1.270 BSC		0.050 BSC	
H	0.410	0.610	0.016	0.024
K	1.100	-	0.043	-
L	0.510	0.710	0.020	0.028
L1	0.060	0.200	0.002	0.008
M	0.500	-	0.019	-
α	0°	12°	0°	12°