

### Product Summary

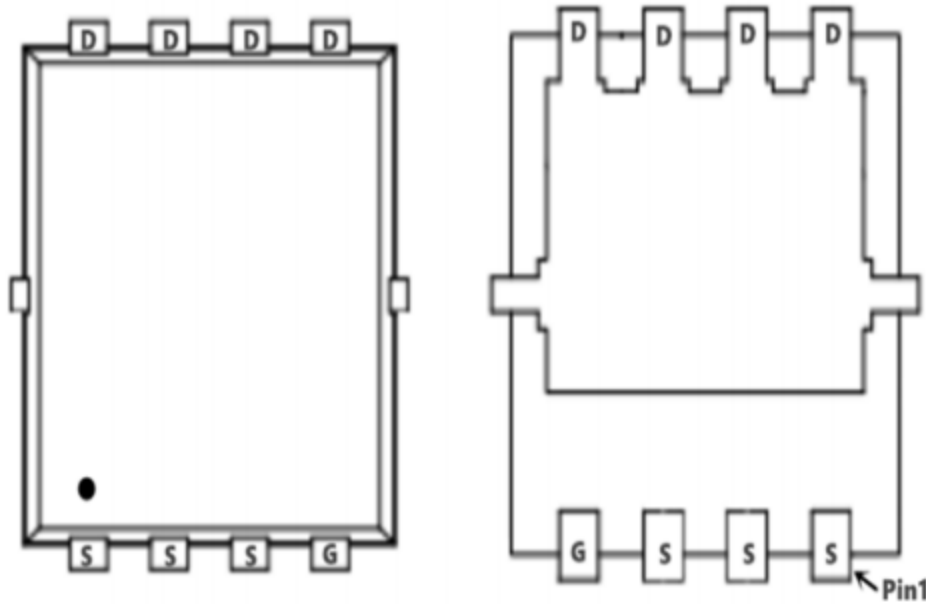
- $V_{DS} = 40V$
- $I_D = 60A$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} = 5.5 m\Omega$  @  $V_{GS} = 10V$
- $R_{DS(ON)} = 6.0 m\Omega$  @  $V_{GS} = 4.5V$

### Application

- Load Switch
- Power management in portable/desktop PCs
- DC/DC conversion

### Package and Pin Configuration

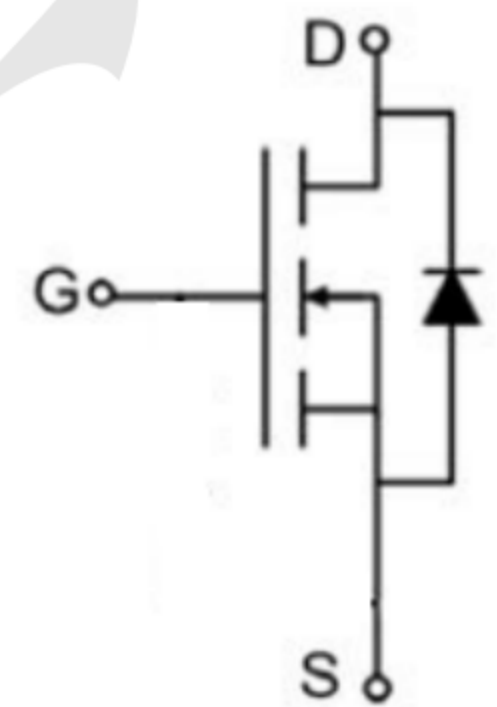
#### DFN5\*6-8L



#### Marking:



#### Circuit diagram



### Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise specified)

Symbol	Parameter	Steady State	Units
$V_{DS}$	Drain-Source Voltage	40	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current <sup>1</sup>	60	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	300	A
$I_S$	Continuous Source Current (Diode Conduction) <sup>1</sup>	60	A
$E_{AS}$	Single Pulse Drain-Source Avalanche Energy <sup>3</sup>	110	mJ
$P_D$	Maximum Power Dissipation	$T_A = 25^\circ C$	2
		$T_C = 25^\circ C$	89
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55~150	$^\circ C$

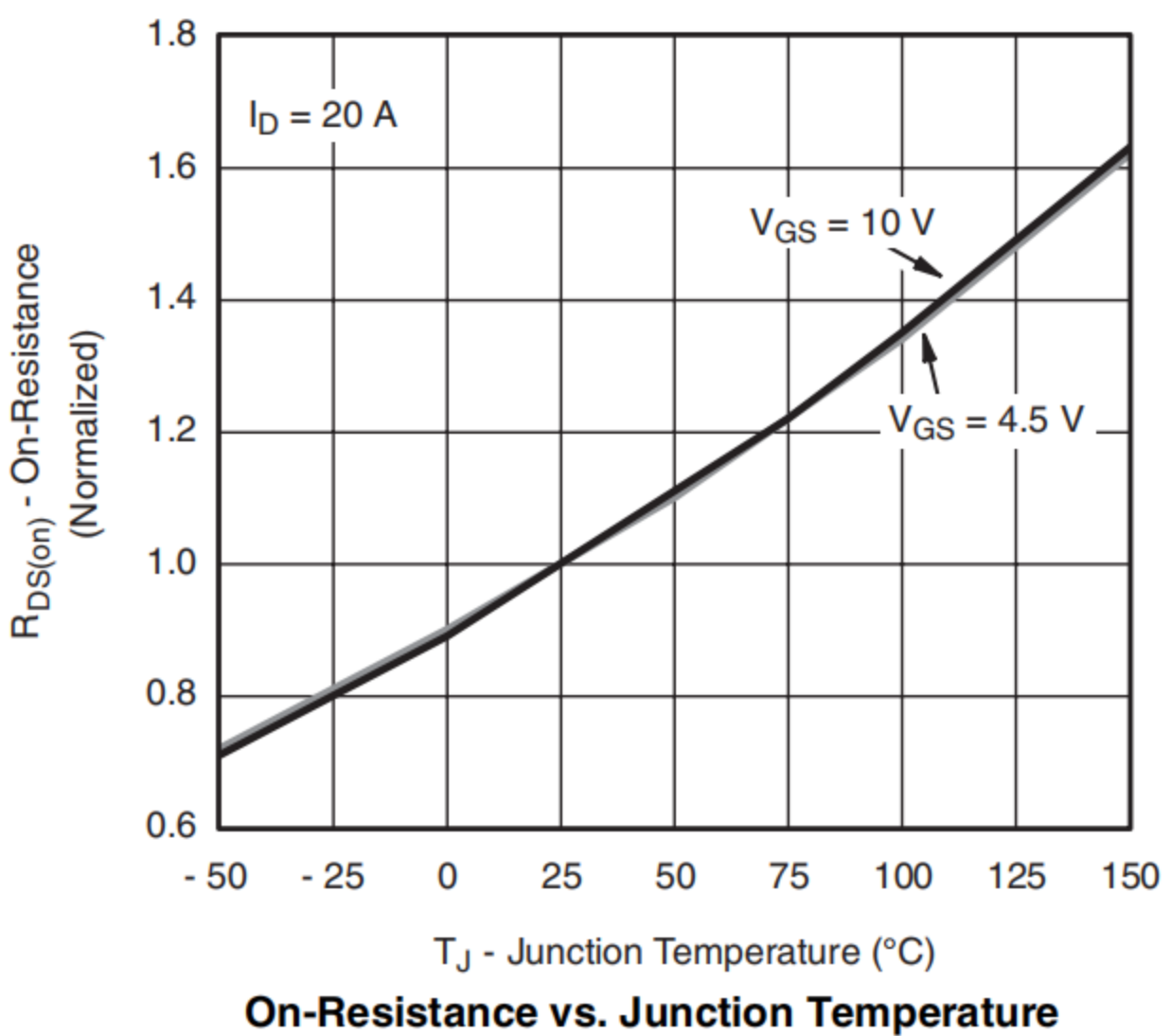
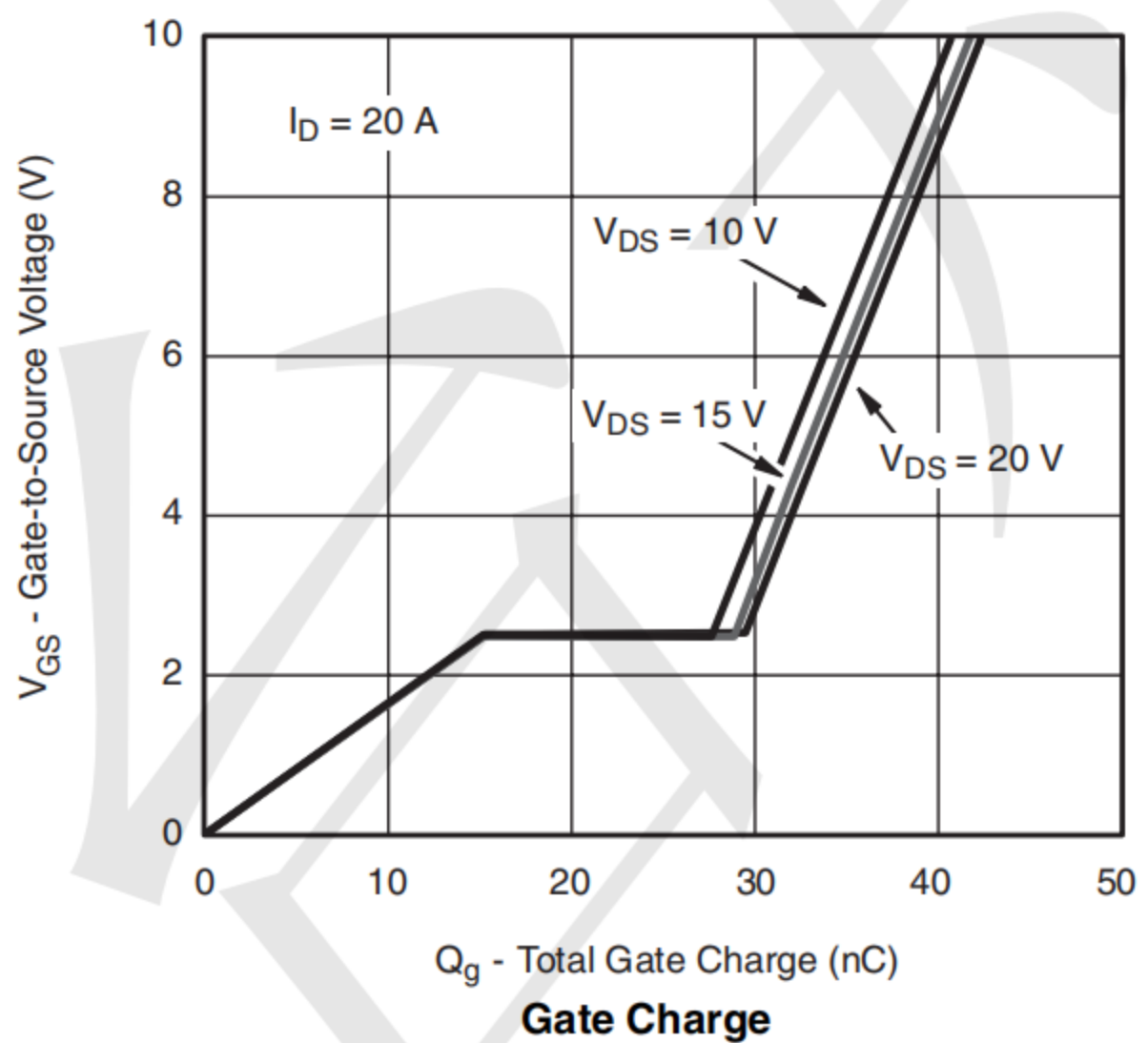
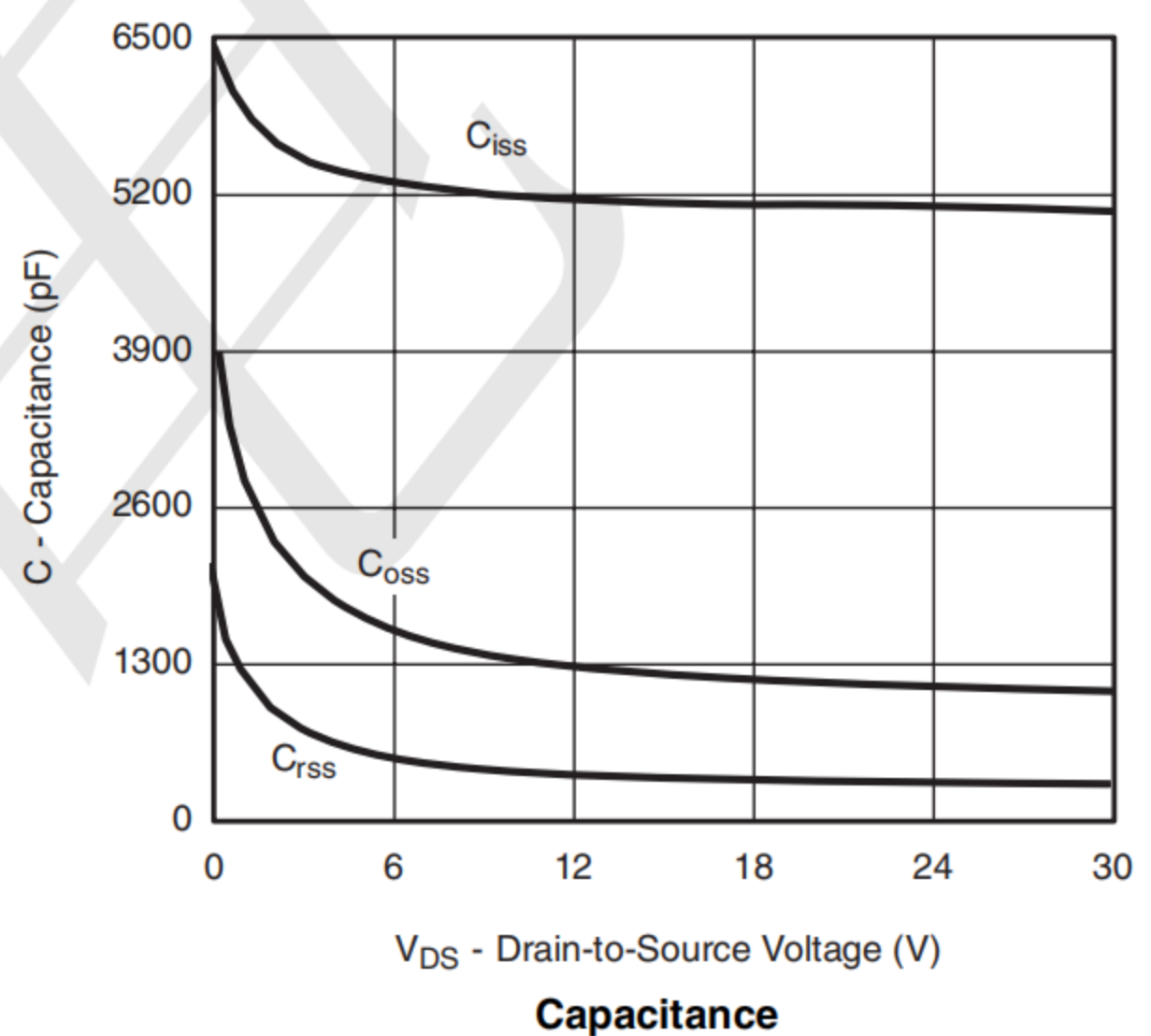
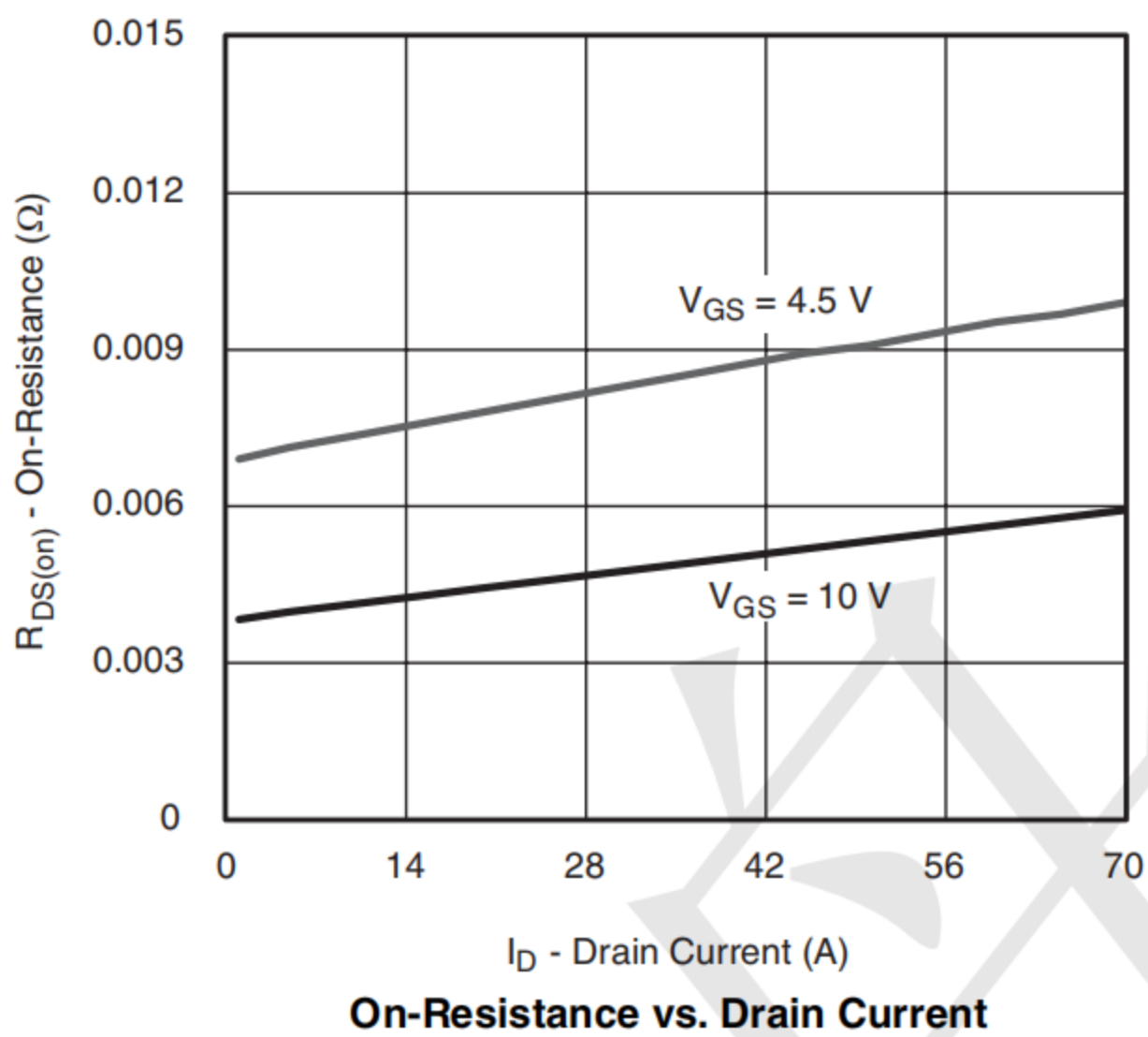
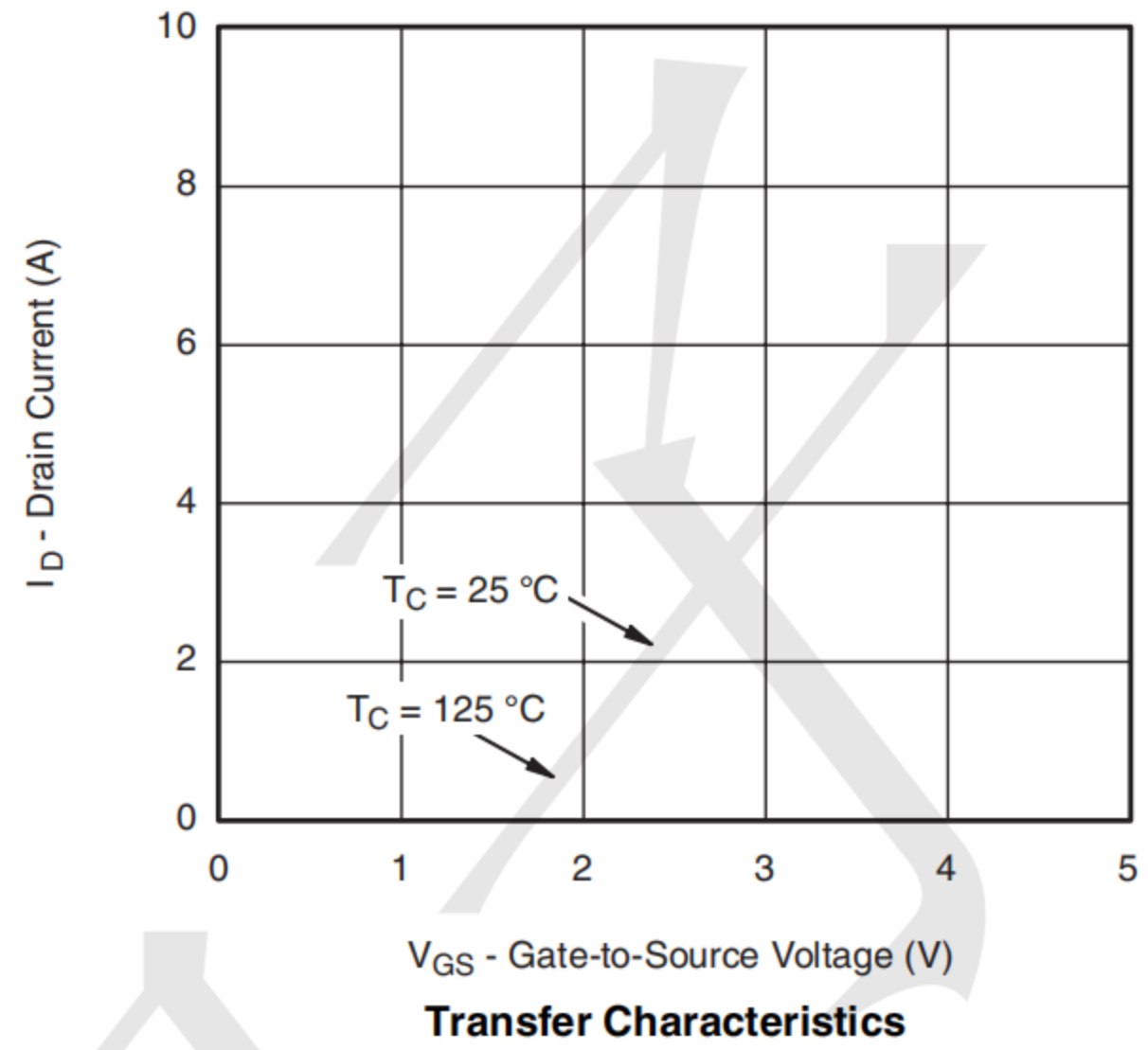
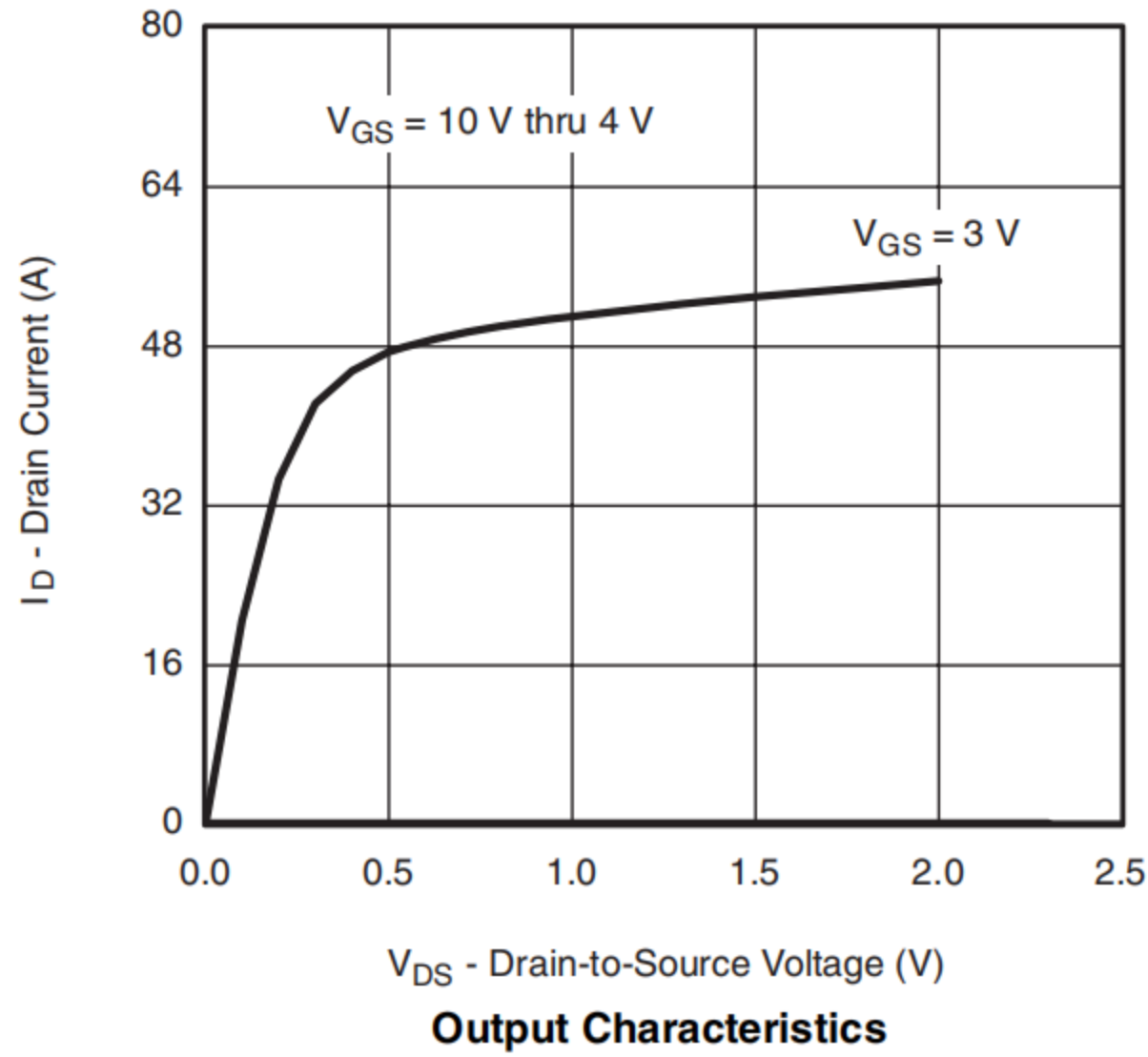
### Thermal Characteristics

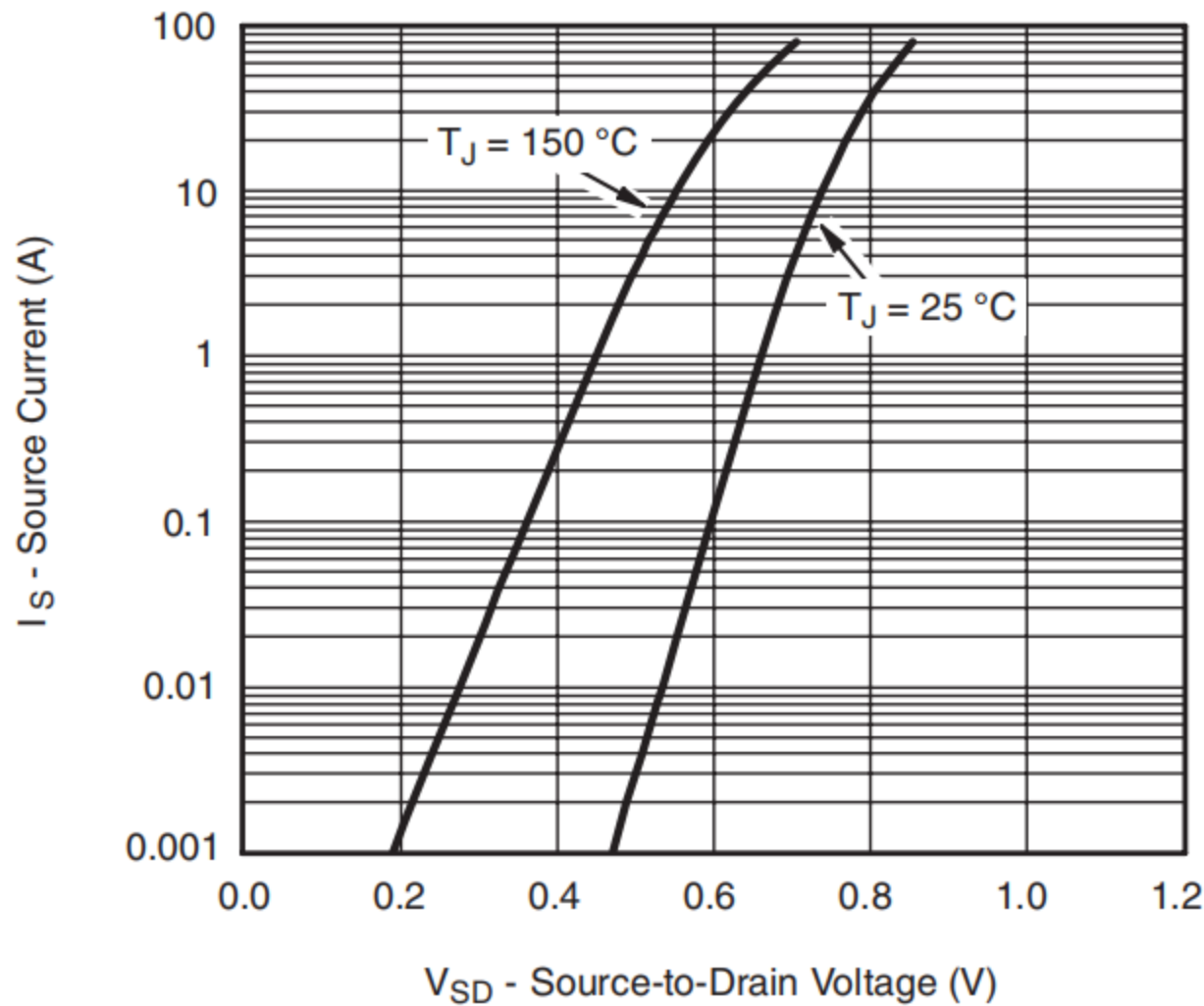
Symbol	Parameter	Typical	Maximum	Unit
$R_{thJA}$	Maximum Junction-to-Ambient	-	62.5	$^\circ C/W$
$R_{thJC}$	Maximum Junction-to-Case	-	1.4	

**Electrical Characteristics** (T =25°C unless otherwise specified)

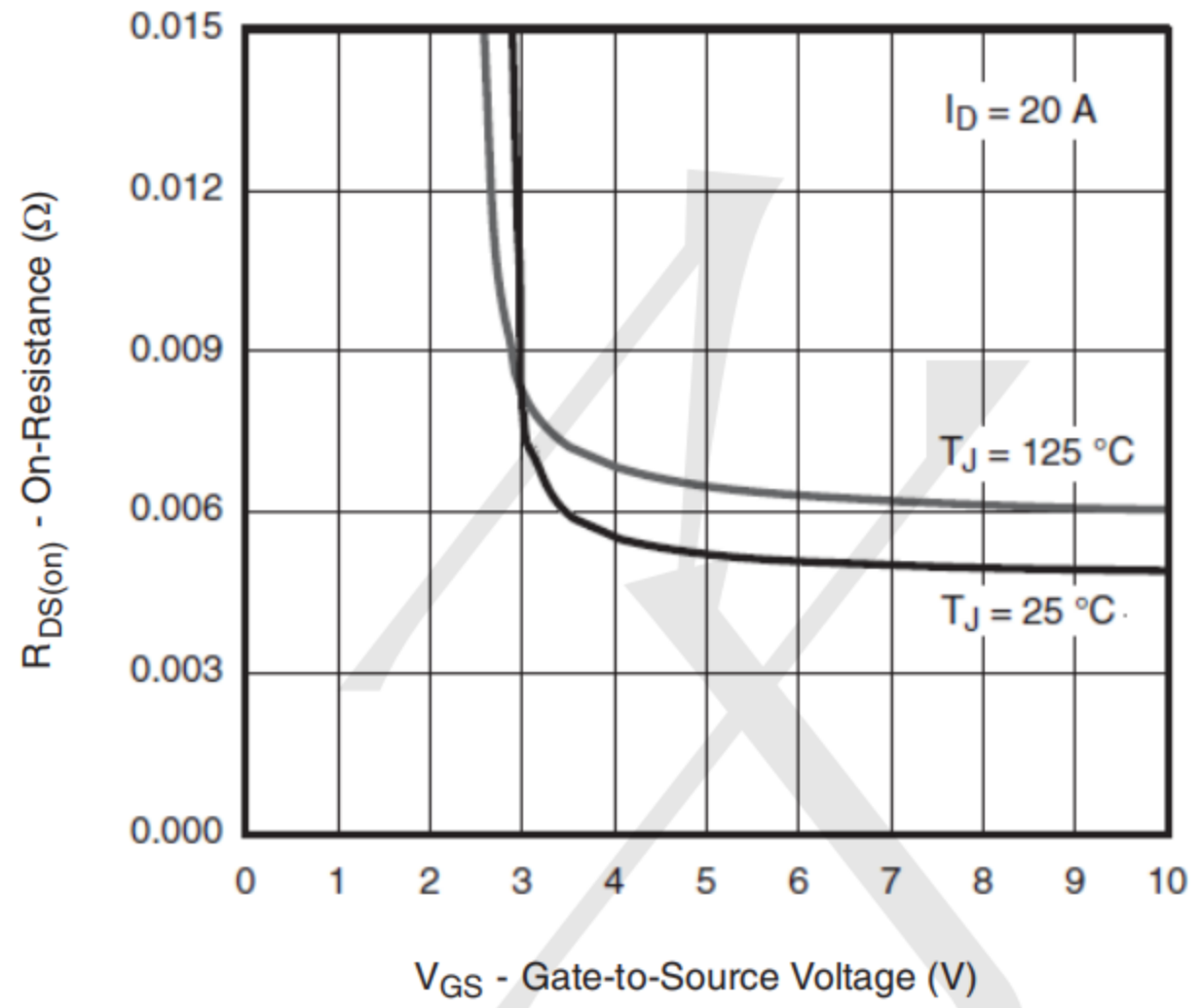
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	40	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250μA	1	1.8	2.2	V
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 32V, V <sub>GS</sub> = 0V	-	-	1	μA
		V <sub>DS</sub> = 32V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 85°C	-	-	30	
R <sub>DS(on)</sub>	Drain Source On State Resistance <sup>a</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 60A	-	5.5	6.5	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 30A	-	6.0	8.0	
V <sub>SD</sub>	Diode Forward Voltage <sup>a</sup>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 40A	-	0.82	1.3	V
<b>Dynamic Characteristics <sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz	-	5120	-	pF
C <sub>oss</sub>	Output Capacitance		-	1210	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	390	-	
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A	-	41	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	15	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	12	-	
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 4.5V I <sub>D</sub> = 20A, R <sub>GEN</sub> = 3Ω	-	22	-	nSec
t <sub>r</sub>	Rise Time		-	35	-	
t <sub>d(off)</sub>	Turn-Off Delay Time		-	50	-	
t <sub>f</sub>	Fall Time		-	27	-	
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =20A, di/dt= 100A/μA, T <sub>J</sub> =25°C	-	33	-	nSec

**Typical Electrical and Thermal Characteristic Curves**

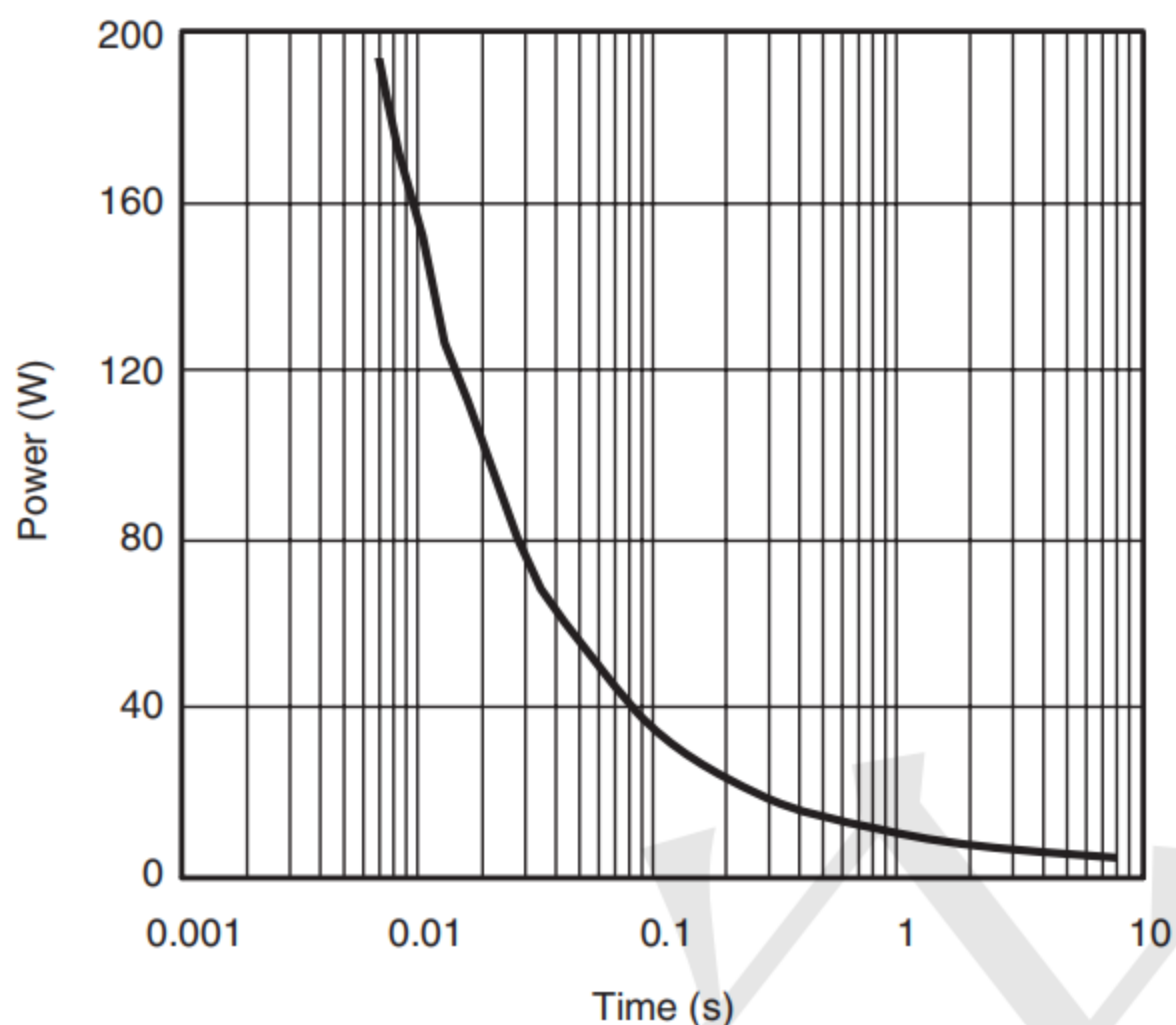




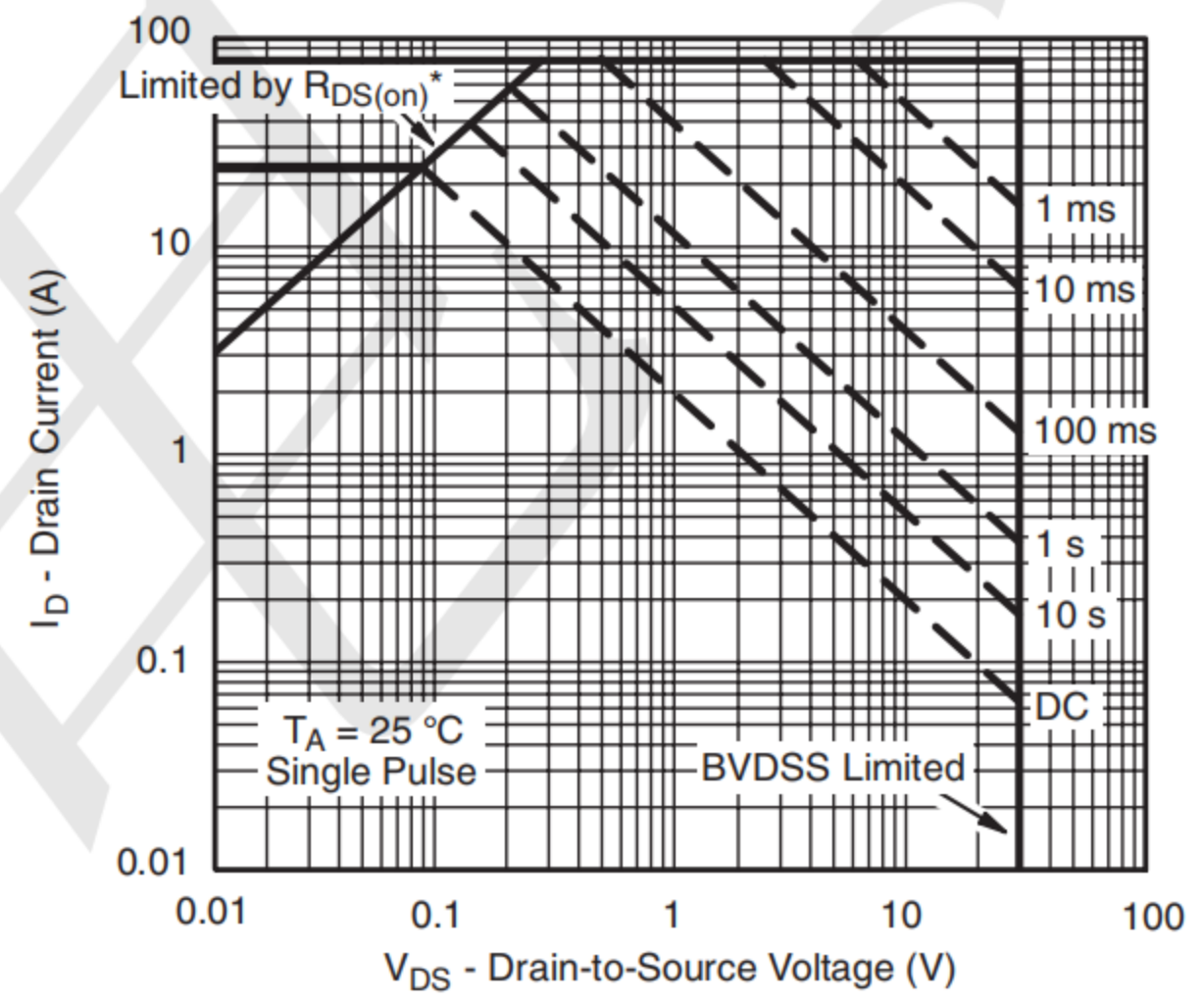
**Source-Drain Diode Forward Voltage**



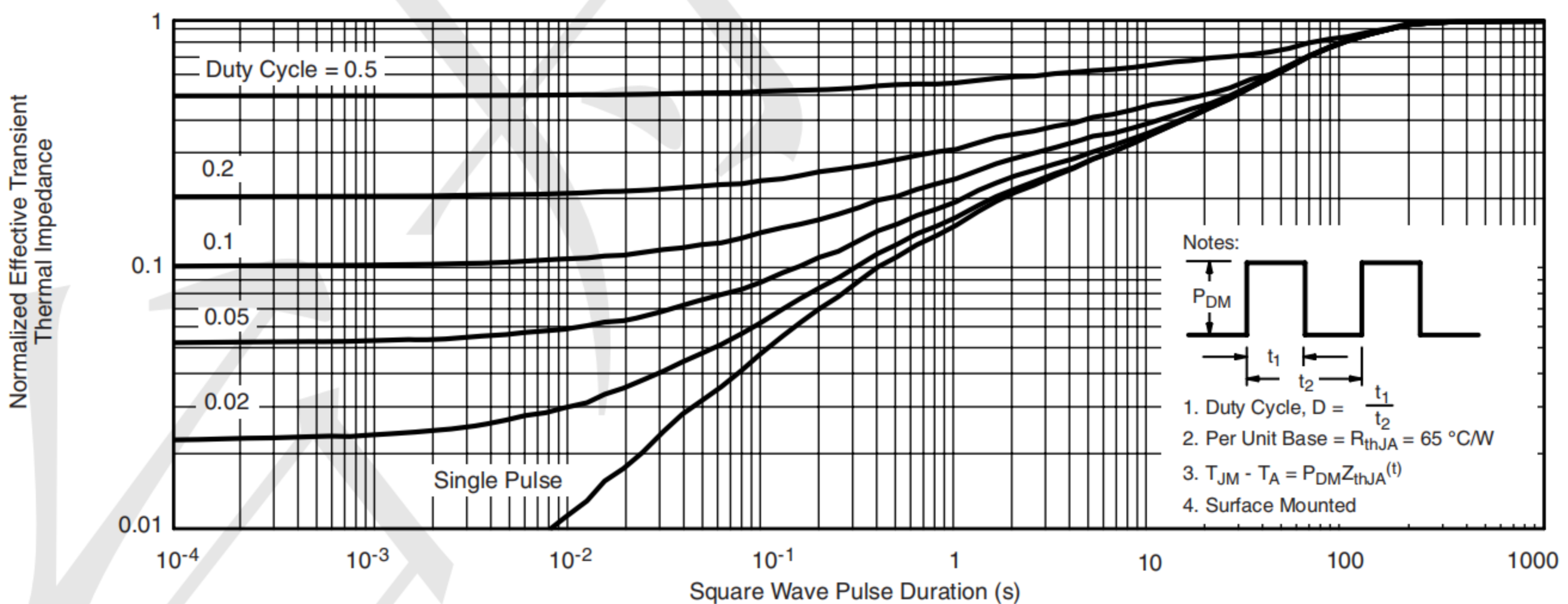
**On-Resistance vs. Gate-to-Source Voltage**



**Single Pulse Power, Junction-to-Ambient**



**Safe Operating Area, Junction-to-Ambient**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**



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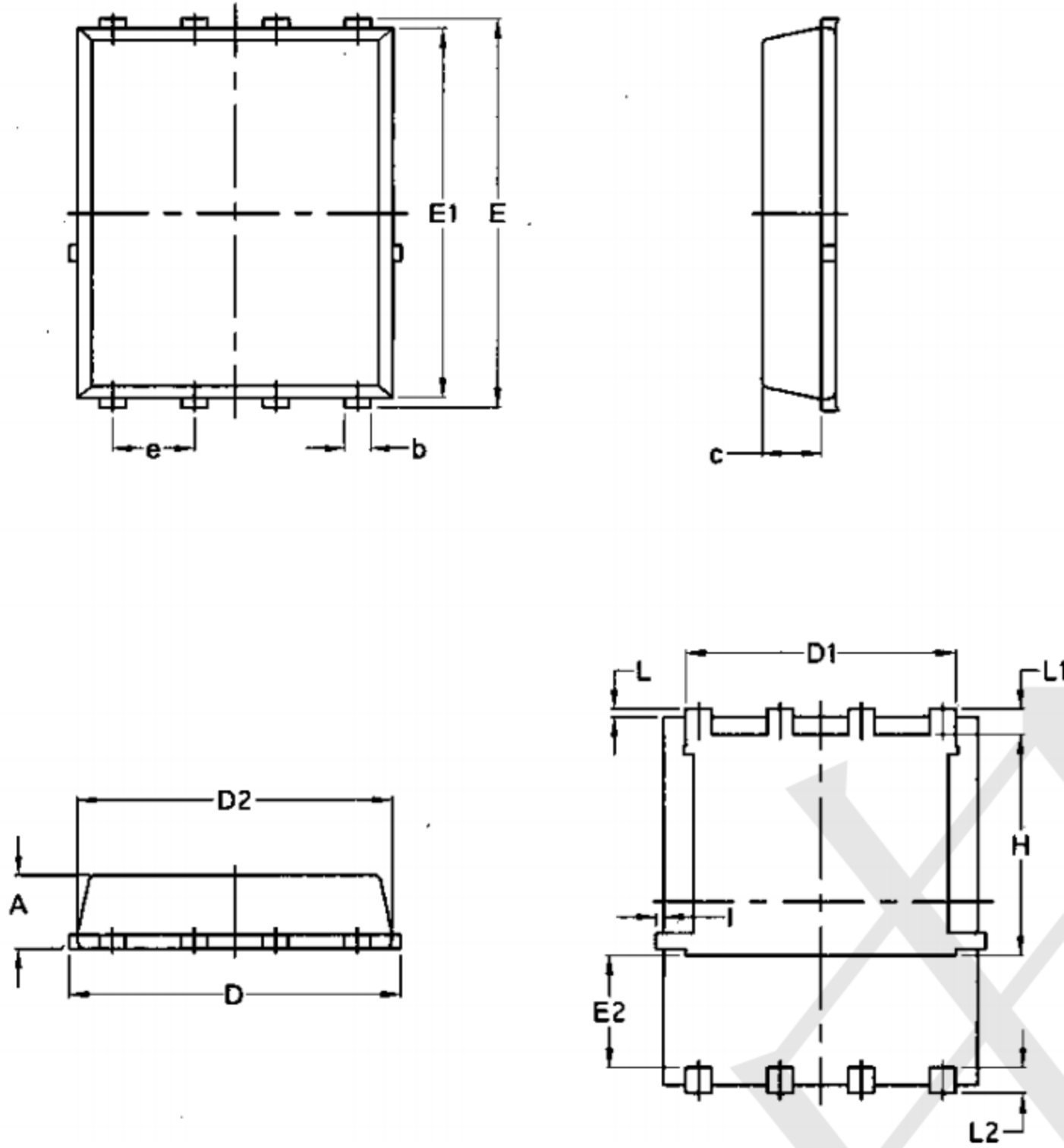
—台丹电子—

**TPM4060ND56-1**

40V N-Channel MOSFET

[www.sot23.com.tw](http://www.sot23.com.tw)

**Package Outline Dimensions DFN5\*6-8L**



Symbol	Common			
	mm		Inch	
	Min	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

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