

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
-40V	6.2mΩ@-10V	-80A
	9.1mΩ@-4.5V	

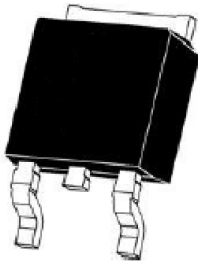
### Feature

- Excellent gate charge x  $R_{DS(on)}$  product(FOM)
- Very low on-resistance  $R_{DS(on)}$
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation

### Application

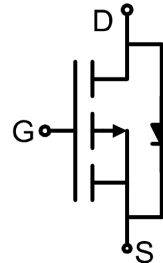
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

### Package

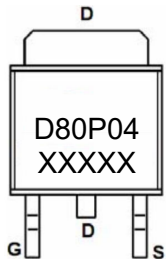


TO-252AB

### Circuit diagram



### Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	-80	A
Continuous Drain Current( $T_C = 100^\circ\text{C}$ )	$I_D (100^\circ\text{C})$	-56.5	A
Pulsed Drain Current	$I_{DM}$	-320	A
Power Dissipation	$P_D$	150	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.0	$^\circ\text{C}/\text{W}$
Single pulse avalanche energy	$E_{AS}$	500	mJ
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

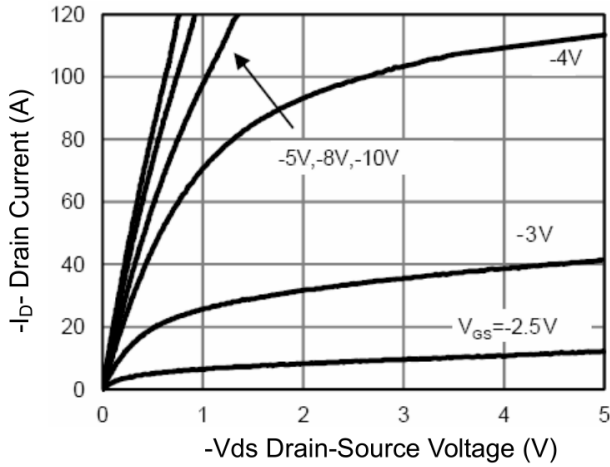
### Electrical characteristics ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$	-40			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -40\text{V}, V_{GS} = 0\text{V}$			-1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$			$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-0.8		-1.8	V
Drain-source on-resistance <sup>1)</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{V}, I_D = -20\text{A}$		5.6	6.2	m $\Omega$
		$V_{GS} = -4.5\text{V}, I_D = -20\text{A}$		7.6	9.1	
Forward transconductance <sup>1)</sup>	$g_{FS}$	$V_{DS} = -5\text{V}, I_D = -20\text{A}$		30		S
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$		3738		pF
Output Capacitance	$C_{oss}$			882		
Reverse Transfer Capacitance	$C_{rss}$			22		
Total Gate Charge	$Q_g$	$V_{DS} = -20\text{V}, V_{GS} = -10\text{V}, I_D = -20\text{A}$		57.2		nC
Gate-Source Charge	$Q_{gs}$			9.8		
Gate-Drain Charge	$Q_{gd}$			7.3		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -20\text{V}, V_{GS} = -10\text{V}, I_D = -20\text{A}, R_{GEN} = 1.6\Omega$		10.5		nS
Turn-on rise time	$t_r$			4		
Turn-off delay time	$t_{d(off)}$			35		
Turn-off fall time	$t_f$			5		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current <sup>1)</sup>	$I_S$				-80	A
Diode Forward voltage	$V_{DS}$	$V_{GS} = 0\text{V}, I_S = -20\text{A}$			-1.2	V
Reverse Recovery Time	$t_{rr}$	$T_J = 25^\circ\text{C}, I_F = -20\text{A}$			24	nS
Reverse Recovery Charge	$Q_{rr}$	$di/dt = -100\text{A}/\mu\text{s}$ <sup>1)</sup>			68	nC

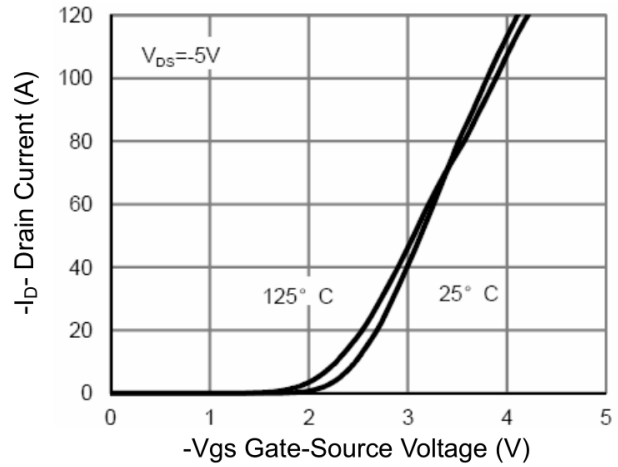
Notes:

- 1) Pulse Test: Pulse Width < 300 $\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
- 2) Guaranteed by design, not subject to production testing.

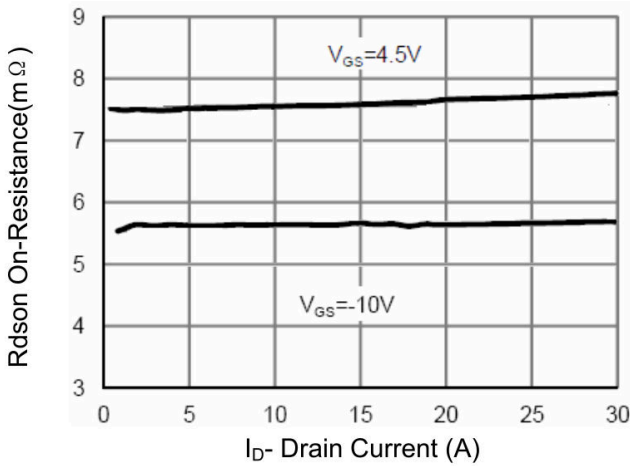
## Typical Characteristics



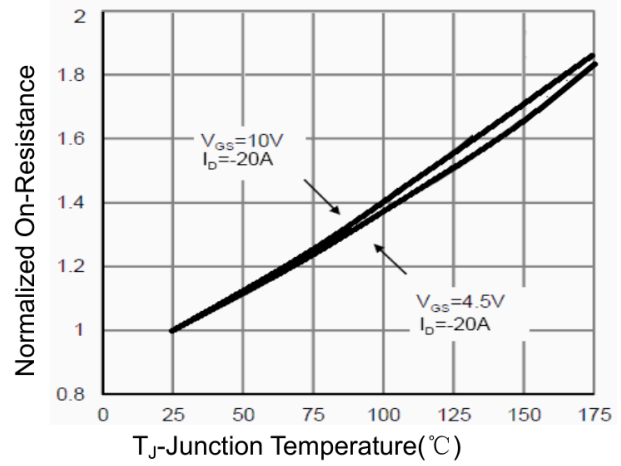
**Figure 1 Output Characteristics**



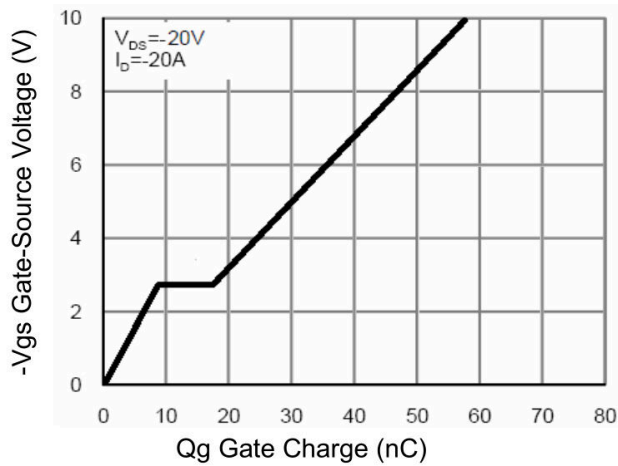
**Figure 2 Transfer Characteristics**



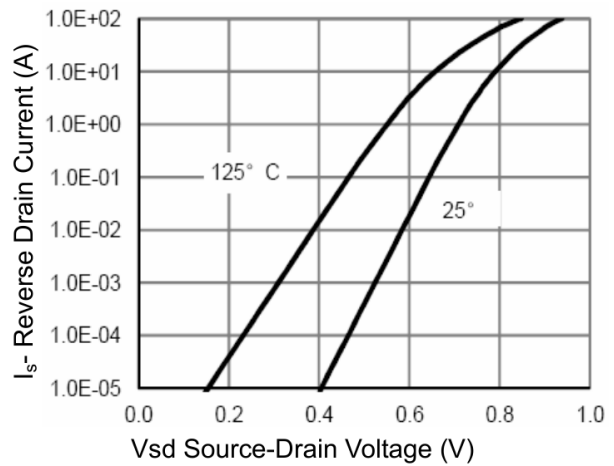
**Figure 3 Rdson- Drain Current**



**Figure 4 Rdson-Junction Temperature**

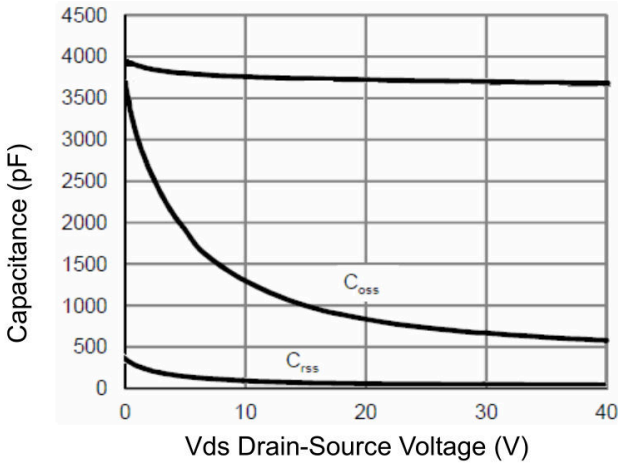


**Figure 5 Gate Charge**

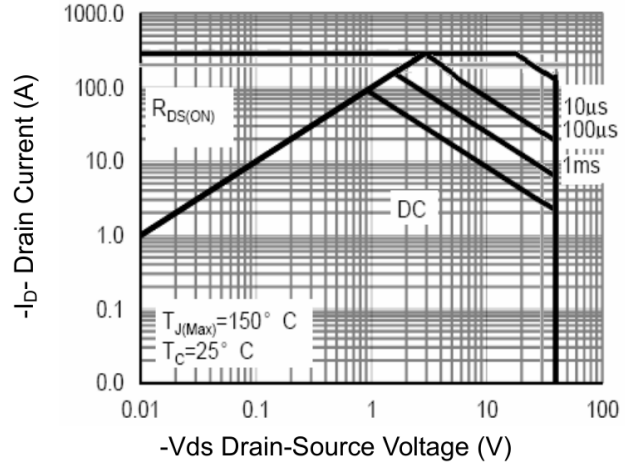


**Figure 6 Source- Drain Diode Forward**

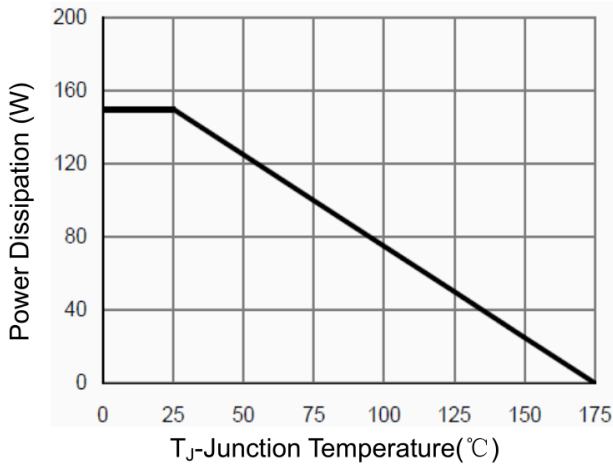
## Typical Characteristics



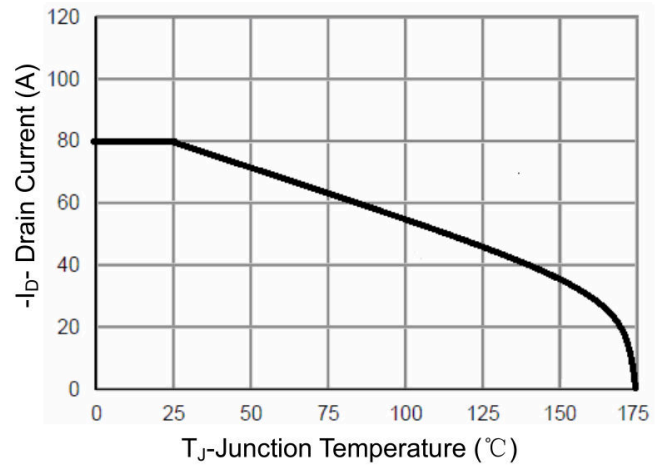
**Figure 7 Capacitance vs Vds**



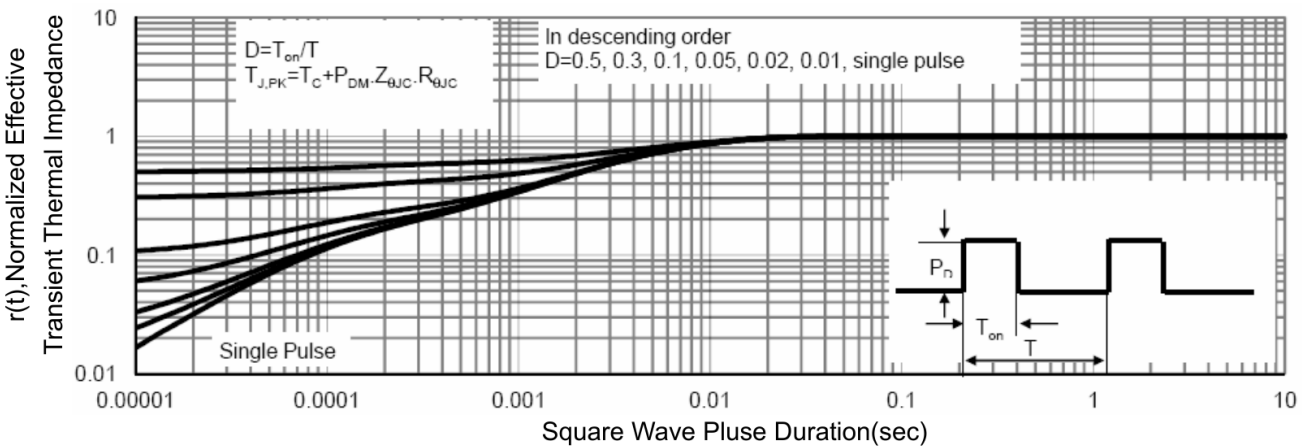
**Figure 8 Safe Operation Area**



**Figure 9 Power De-rating**

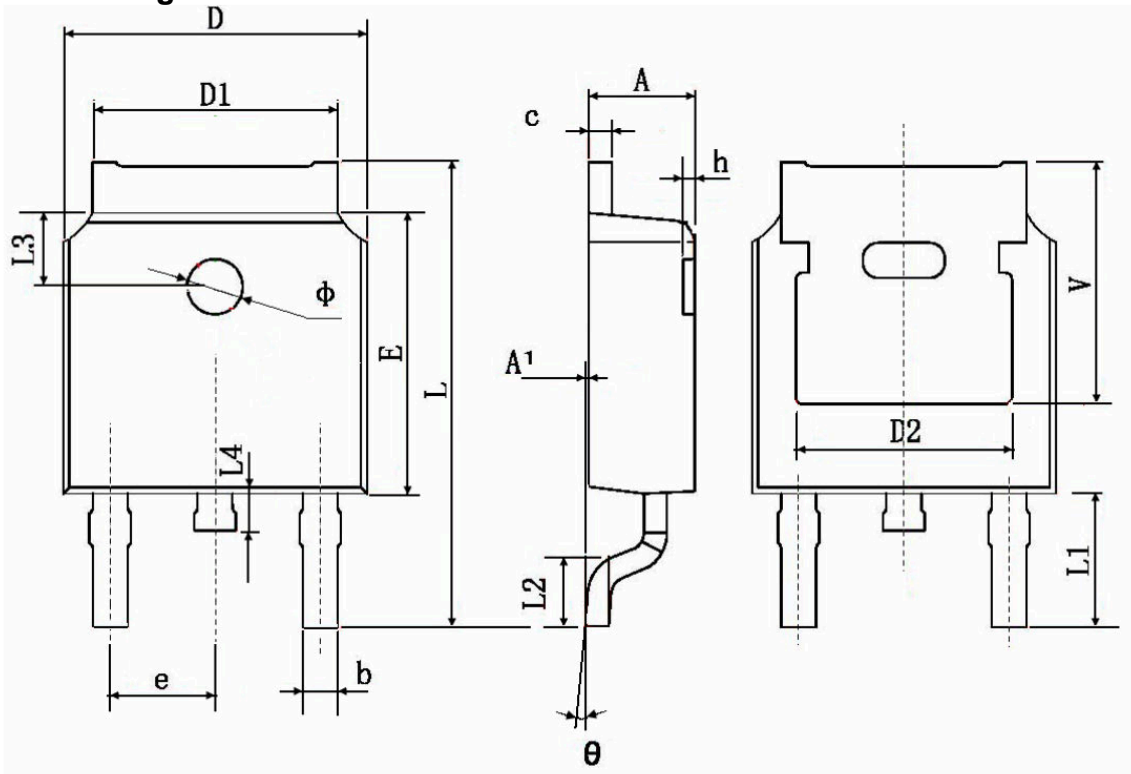


**Figure 10 Current De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

### TO-252AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	