

## GL Silicon N-Channel Power MOSFET

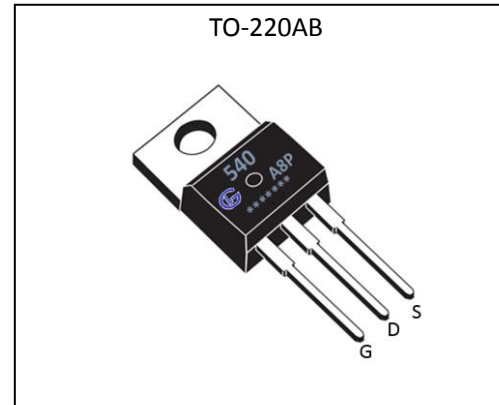
### General Description :

The GL540A8P uses advanced Planar technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications. The package form is TO-220AB, which accords with the RoHS standard.

$V_{DSS}$	100	V
$I_D$	33	A
$P_D$	150	W
$R_{DS(ON)type}$	30	m $\Omega$

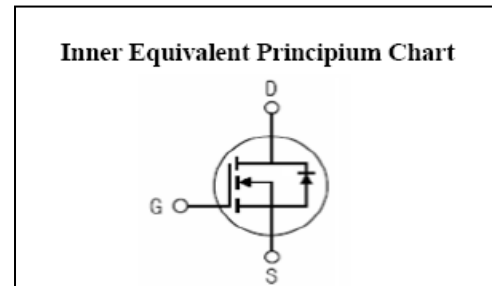
### Features :

- $R_{DS(ON)} < 44m\Omega @ V_{GS}=10V$  (Typ30m $\Omega$ )
- High density cell design for ultra low  $R_{dson}$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation



### Applications :

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



### Absolute ( $T_c= 25^\circ C$ unless otherwise specified ) :

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-to-Source Voltage	100	V
$I_D$	Continuous Drain Current	33	A
$I_{DM}$	Pulsed Drain Current	132	A
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$P_D$	Power Dissipation	150	W
$E_{AS}$	Single pulse avalanche energy <sup>a5</sup>	750	mJ
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	175 , -55 to 175	$^\circ C$



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Electrical Characteristics (  $T_c = 25^\circ\text{C}$  unless otherwise specified ) :

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$V_{DSS}$	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	--	--	V
$I_{DSS}$	Drain to Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_a=25^\circ\text{C}$	--	--	1.0	$\mu A$
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+20V$	--	--	0.1	$\mu A$
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-20V$	--	--	-0.1	$\mu A$

ON Characteristics <sup>a3</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=17A$	--	30	44	m $\Omega$
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	--	4.0	V

Pulse width  $t_p \leq 380\mu s, \delta \leq 2\%$

Dynamic Characteristics <sup>a4</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$g_{fs}$	Forward Transconductance	$V_{DS}=15V, I_D=17A$	--	80	--	S
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=25V$ $f=1.0\text{MHz}$	--	2700	--	pF
$C_{oss}$	Output Capacitance		--	300	--	
$C_{rss}$	Reverse Transfer Capacitance		--	10	--	

Resistive Switching Characteristics <sup>a4</sup>						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=50V, I_D=17A$ $V_{GS}=10V, R_G=9.1\Omega$	--	18	--	ns
$t_r$	Rise Time		--	20	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	53	--	
$t_f$	Fall Time		--	7	--	
$Q_g$	Total Gate Charge	$V_{DD}=50V, I_D=17A$ $V_{GS}=10V$	--	37	--	nC
$Q_{gs}$	Gate to Source Charge		--	11	--	
$Q_{gd}$	Gate to Drain ( "Miller" ) Charge		--	8	--	

## GL Silicon N-Channel Power MOSFET

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$I_S$	Continuous Source Current <sup>a2</sup> (Body Diode)		--	--	33	A
$V_{SD}$	Diode Forward Voltage <sup>a3</sup>	$I_S=33A, V_{GS}=0V$	--	--	1.2	V
$t_{rr}$	Reverse recovery time	$I_F=33,$		150		ns
$Q_{rr}$	Reverse recovery charge	$di_F/dt=100A/\mu s$		0.55		uC

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case <sup>a2</sup>	1	°C/W
$R_{\theta JA}$	Junction-to-Ambient	62	

<sup>a1</sup> : Repetitive Rating: Pulse width limited by maximum junction temperature.

<sup>a2</sup> : Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$ .

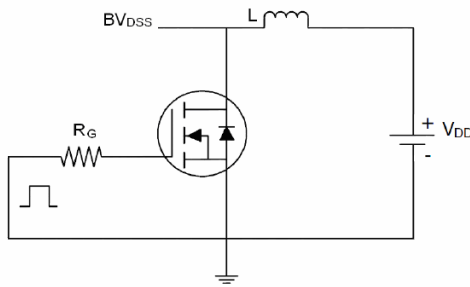
<sup>a3</sup> : Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

<sup>a4</sup> : Guaranteed by design, not subject to production

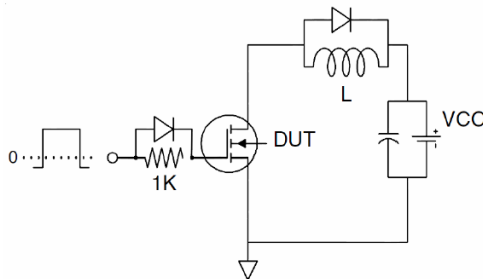
<sup>a5</sup> : EAS condition :  $T_j=25^\circ\text{C}, V_{DD}=35V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$

### Test circuit

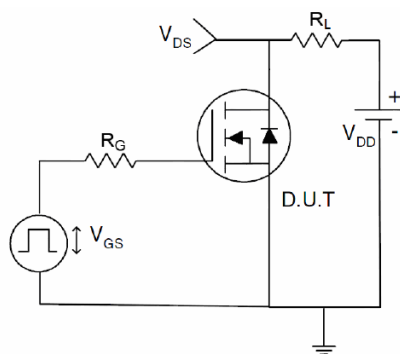
#### 1) EAS test Circuit



#### 2) Gate charge test Circuit



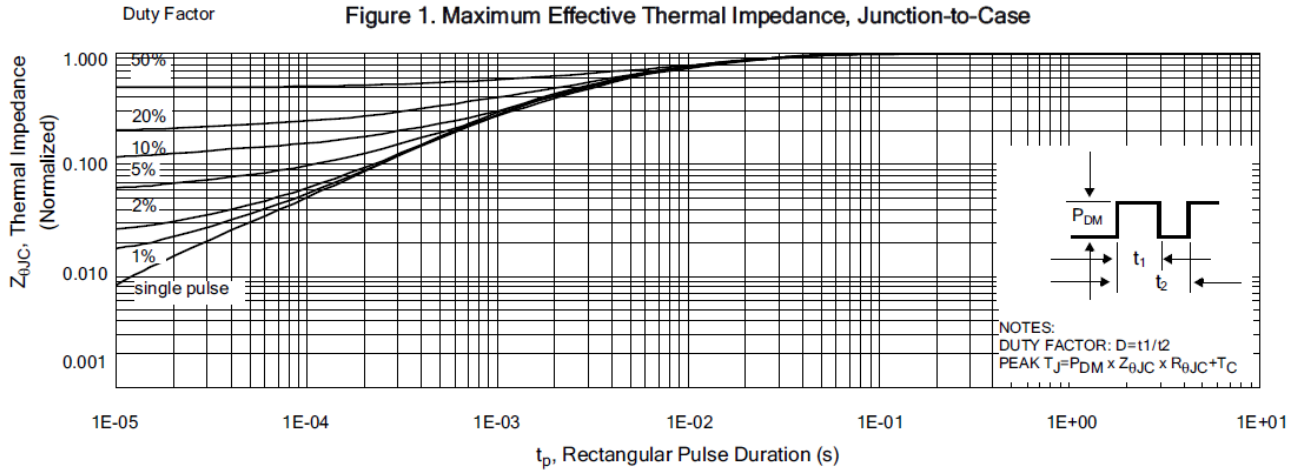
#### 3) Switch Time Test Circuit



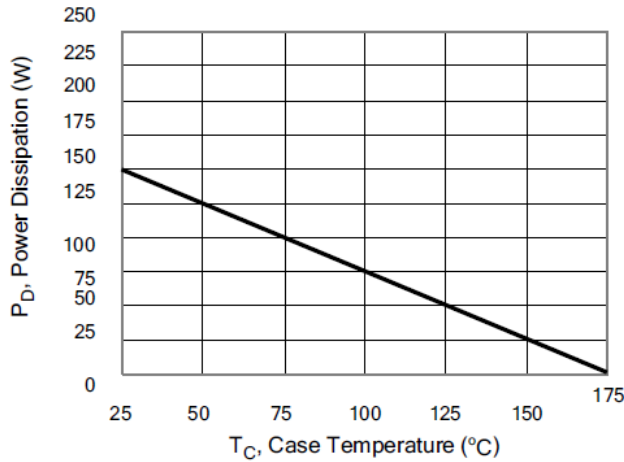


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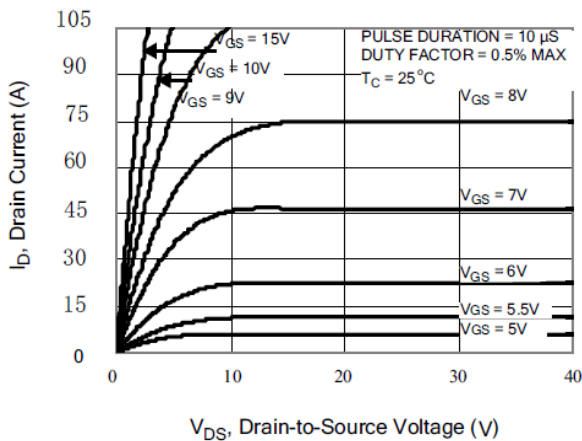
### Characteristics Curve :



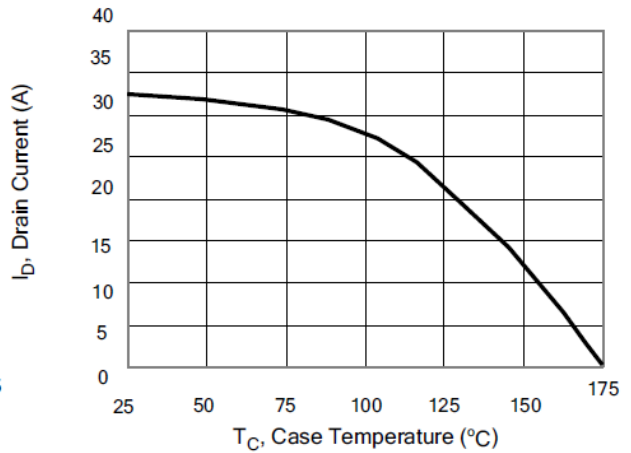
**Figure 2. Maximum Power Dissipation vs Case Temperature**



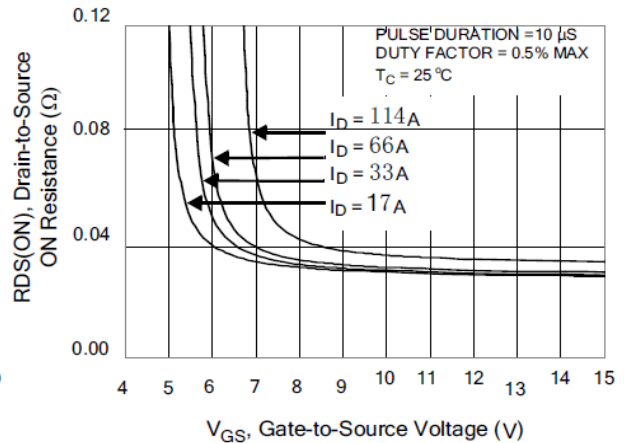
**Figure 4. Typical Output Characteristics**



**Figure 3. Maximum Continuous Drain Current vs Case Temperature**



**Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current**





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Figure 6. Maximum Peak Current Capability

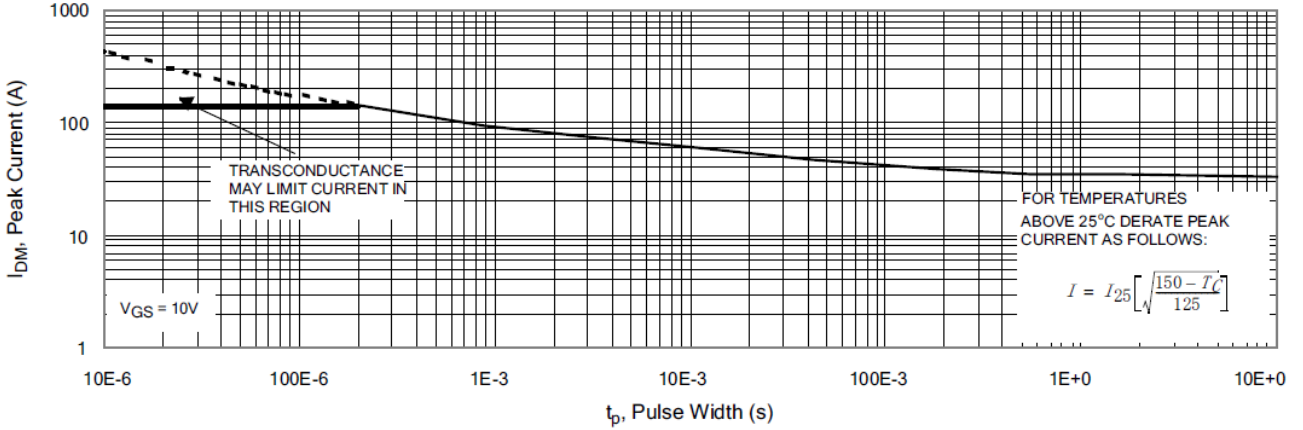


Figure 7. Typical Transfer Characteristics

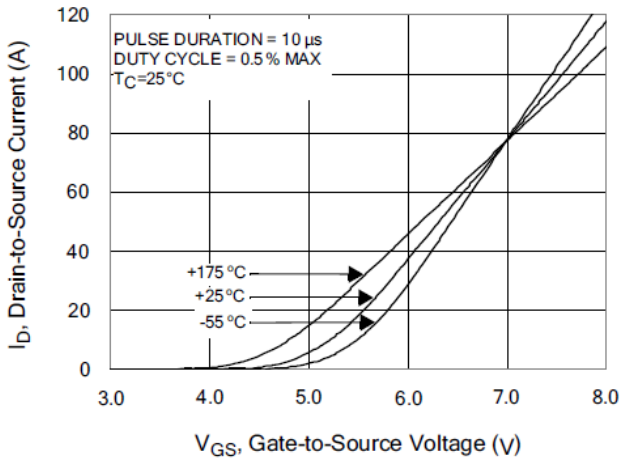


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

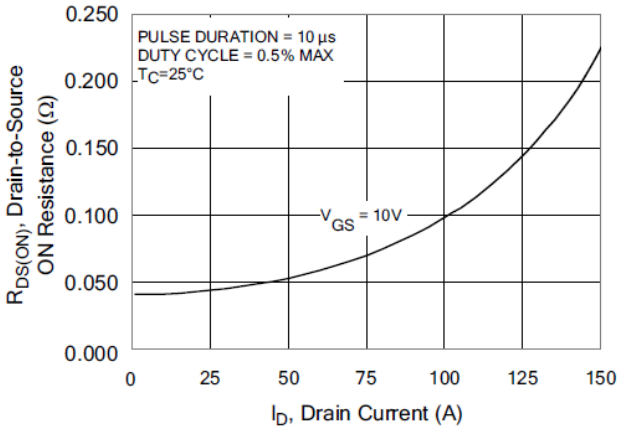


Figure 8. Unclamped Inductive Switching Capability

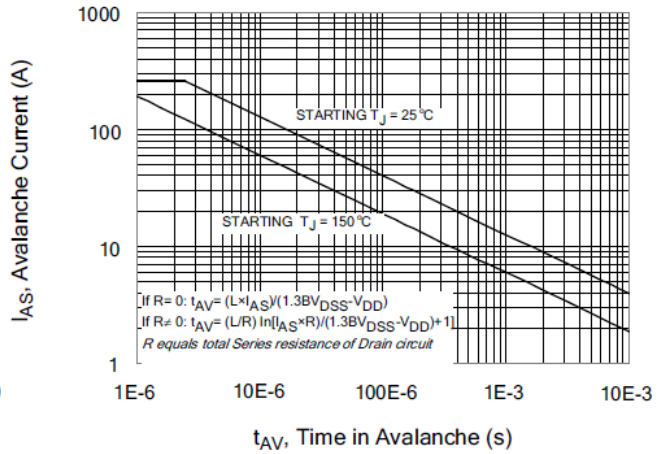
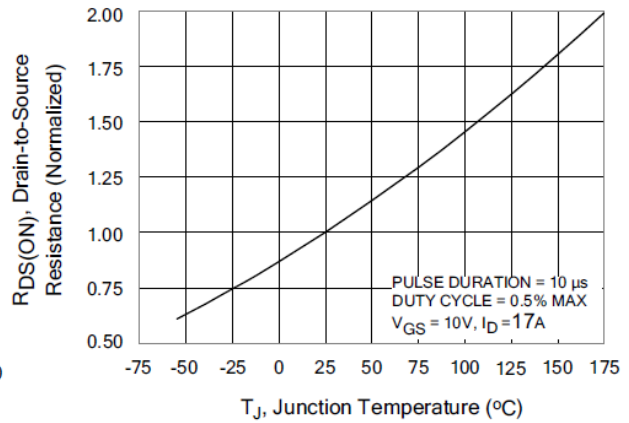


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature





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Figure 11. Typical Breakdown Voltage vs Junction Temperature

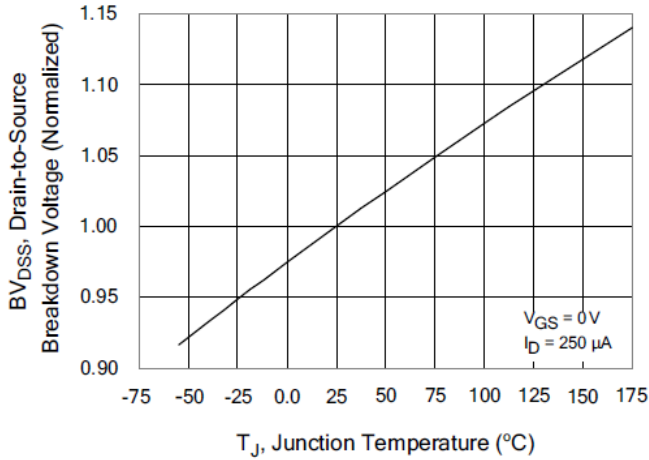


Figure 12. Typical Threshold Voltage vs Junction Temperature

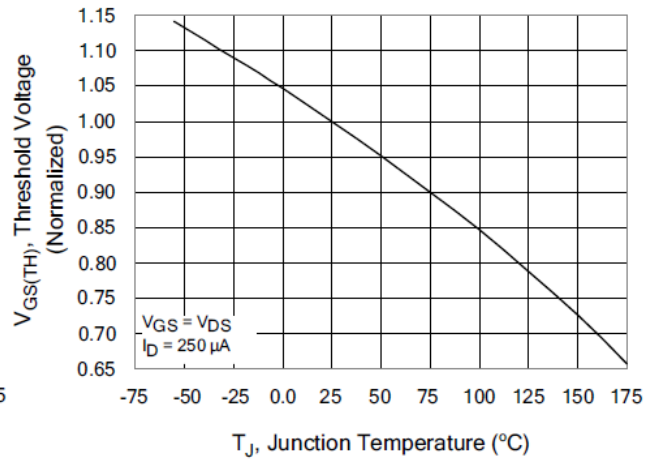


Figure 13. Maximum Forward Bias Safe Operating Area

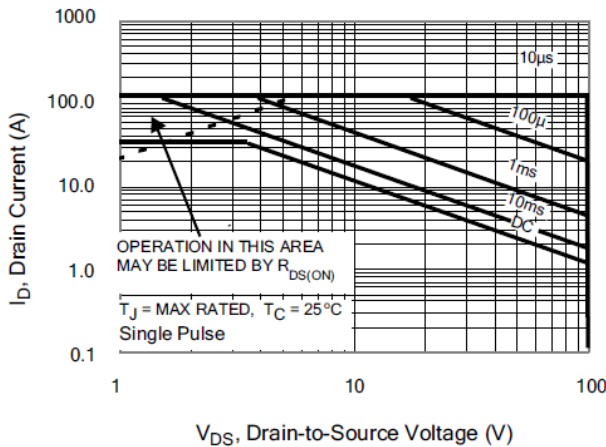


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

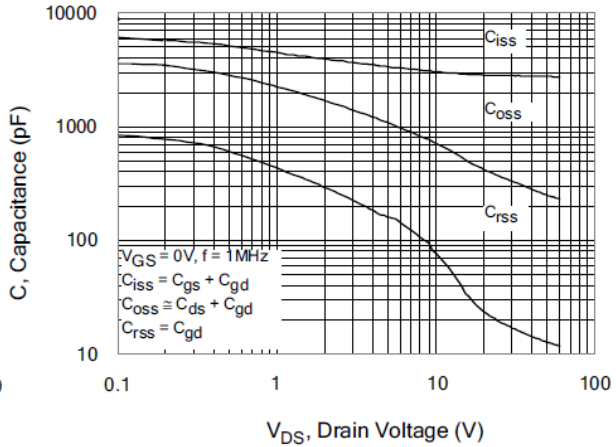


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

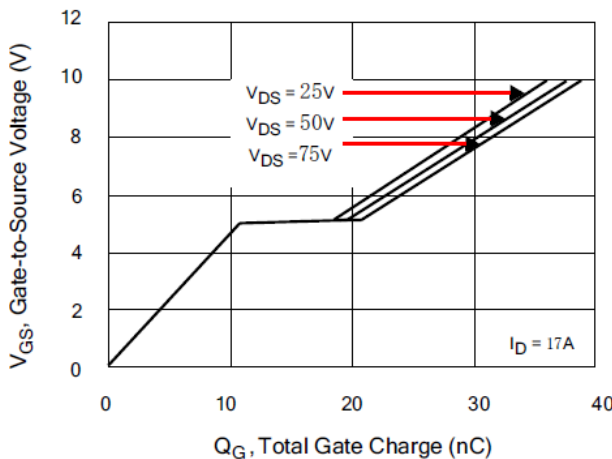
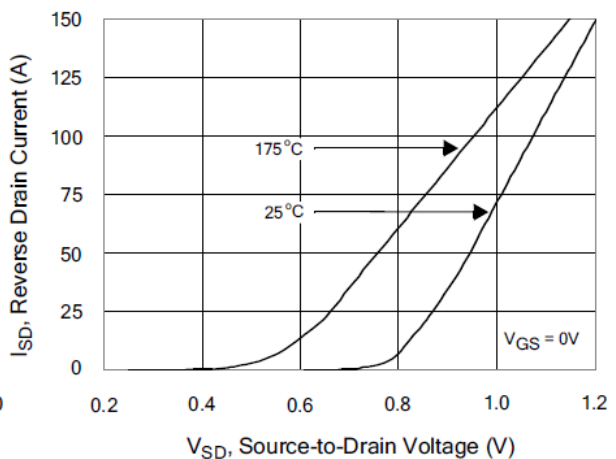


Figure 16. Typical Body Diode Transfer Characteristics



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